White Paper

May 2006

M600

Sony Ericsson

Preface

Purpose of this document

This White Paper will be published in several revisions as the phone is developed. Therefore, some of the headings and tables contain limited information. Additional information and facts will be forthcoming in later revisions.

The aim of this White Paper is to give the reader an understanding of the technology M600 uses and to show the main applications, functions and features of the phone.

This document is aimed at:

- Operators.
- Service providers.
- Software developers.
- Support engineers.
- Application developers.
- Retailers.
- IT decision makers.

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Sony Ericsson Developer World

On www.SonyEricsson.com/developer, developers will find documentation and tools such as phone White Papers, Developers Guidelines for different technologies, SDKs and relevant APIs. The web site also contains discussion forums monitored by the Sony Ericsson Developer Support team, an extensive Knowledge Base, Tips and Tricks, example code and news.

Sony Ericsson also offers technical support services to professional developers. For more information about these professional services, visit the Sony Ericsson Developer World web site.

Document history

Change history		
May 2006	Version R1A	First Release

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Product comparison

The Sony Ericsson M600 and P990 smartphones have important differences in both hardware and software. M600 is aimed at the messaging market and has had the camera, video conferencing, WLAN and FM radio P990 functionality removed.

Introduction

M600

- M600 is built on the same platform as P990 and is supplied with a lot of the same software.
- M600 is targeted at people who require specific, easy to use functionality at affordable prices.
- M600 users can receive, handle and send emails conveniently and efficiently.
- M600 supports UMTS (Global System for Mobile Communications), GSM + EGSM 900/ DCS 1800/PCS 1900, GPRS (General Packet Radio Service), Multislot class 10 (4+2) and HSCSD (Highspeed Circuit Switched Data).
- M600 is a thin and stylish phone.
- M600 supports the push email clients for the major operator solutions.
- M600 has a dual function keyboard. This concept allows users to switch between numeric and alphabetic input modes.
- M600 is supplied with VPN to protect users.
- M600 is a 3G phone. 3G gives great performance and flexibility to applications such as email, browsing and multitasking.
- M600 is supplied with a 64 MB Memory Stick Micro™ M2™.

P990

- The P990 is a mobile phone and personal organiser in one.
- The P990 is targeted at professional pioneers who want to be first to have and use new technology.
- The P990 is a WLAN phone. The WLAN can be used to access hotspots and to connect to networks.
- The P990 features a 2 megapixel camera with auto focus.
- The P990 has an additional VGA camera on the front of the phone for making video calls.
- The P990 has an advanced picture editing application.
- The P990 has an FM Radio with RDS.
- The P990 is supplied with either a Memory Stick™ Pro or a Pro Duo.

Images

M600

P990

Hardware

Added to M600

One handed use	M600 can be easily operated with one hand.
Memory Stick Micro™ M2™	New Memory Stick.
Dual function keyboard	Allow the user to switch between numerical and alphabetic modes.
Appearance	M600 has a modern stylish look and feel.

Removed compared to P990

WLAN	M600 does not have WLAN capabilities.
2 megapixel camera	M600 is a camera free phone.
Video call camera	M600 does not offer video call functionality.
FM Radio chip	M600 does not have an FM Radio.
Flip	M600 does not have a flip.
Memory Stick™ Pro/Pro Duo	Replaced by the Memory Stick Micro™ M2™.
Key lock button	M600 does not have a key lock button. Alternative key lock methods are available.
Play key	M600 does not have a play button.
Camera light	Removed because there is no camera.
Lens cover	Removed because there is no camera.
Rocker switch	The rocker switch has been removed.
Dual front phone design	M600 has a front and a back.
Business Card Scanner	M600 has no camera so it can’t scan business cards.

Software

Removed compared to P990

FM Radio	P990 has an RDS FM radio with a clock radio function and recording capabilities.
Video telephony	P990 has dual cameras; a 2 megapixel camera on the back of the phone and a video call camera on the front of the phone. Using the back camera, users can share what they see with the video call recipient. The camera can be set-up to automatically switch on when a call is received. The camera feed can be swapped to show a stored picture, allowing the caller's reaction to be seen.
Business Card Scanner	It is possible to take a photo of a business card and then use the Business Card Reader application to scan the card. The scanned text can then be saved as a Contact.

Comparison table

	M600	**P990**
Hardware		
Size (mm) and weight	105 x 54 x 15, 112g	114 x 57 x 21-26 (body flip), 155g
Talk time (hours)	GSM up to 7.5 hours UMTS up to 2.5 hours	9
Stand-by time (hours	GSM up to 340 hours UMTS up to 250 hours	400
MMI	UIQ 3.0 UTC support Improved calendar with support for automatic time zone Improved customization ability Birthday field in contatcs	UIQ 3.0 UTC support Improved calendar with support for automatic time zone Improved customization ability Picture synchronization and birthday field in contatcs
Display	2.55" 240 x 320 pixels 262 k colour touchscreen	2.76" 240 x 320 pixels 262 k colour touchscreen
Jog dial	3 way	3 way
RAM memory	64 MB	64 MB
Flash memory	128 MB	128 MB
User memory internal	Up to 80 MB (without 3D games)	Up to 80 MB (without 3D games)
User memory external	64 MB Memory Stick Micro™ M2™	64 MB Memory Stick™ Duo PRO (supplier Scandisk)

Camera	No camera	2 Mega pixels 2.5 Digital Zoom Macro Mode Camera Light Picture Editing application
Key lock key	No	Yes
Play key	No	Yes
Connectivity	USB 2.0 full speed USB Mass storage support USB charging support IrDA (moved to the top of the phone) Bluetooth 2.0	USB 2.0 full speed USB Mass storage support USB charging support IrDA (moved to the top of the phone) Bluetooth 2.0 WLAN 802.11b, 11 Bit/s
Video record	No	Yes
Software		
Picture speed dial	Yes	Yes. Tap picture to call, video call or open the contacts details.
Time	Yes The clock can use any supported audio file as the alarm signal.	Yes The clock can use FM Radio or Media Player as the alarm signal.
Packaging		
Memory stick	64 MB Memory Stick Micro™ M2™ Includes Try and Buy applications	64 MB Memory Stick™ Pro Duo (supplier Sandisk), max 4 GB Includes Try and Buy applications
CDs	Yes PC Suite	1 PC Suite

User interface

A	Loud speaker	G	Shortcut button
B	Stylus	H	Slot for memory stick
C	Jog dial	I	Screen
D	Back button	J	Dual function keyboard
E	Infrared port	K	Connection for accessories and charger
F	On/off button	L	Microphone

Industrial design

M600 is a thin and sleek UMTS smartphone. The look is highly contemporary. The main focus in M600 is efficient communication and messaging. The large bright touch screen (2.55" QVGA TFT, 262 k colours), the virtual keyboard with stylus, handwriting recognition and the dual function keyboard (you can switch between numerical and alphabetical modes) support easy and versatile messaging. Auto correction, word completion and the illumination of keyboard all improve the texting and dialling functionality of the phone.

M600, like the P990 supports full push email (Blackberry and other email solutions) and allows for attachment handling.

M600 browses using Opera 8.0, the full html browser, the phone also supports RSS feeds to help users get the most out of the mobile Internet.

The Internal memory is 80 MB and there is a Memory Stick Micro™ M2™ 64 MB in the box.

M600 comes with a media player (E-AAC+ support), PlayNow 2.0 can be used to play tracks and music can be download over the air.

The memory allows up to 2 hours worth of music to be stored.

A USB cable, stereo headphones and PC software are provided in the box.

M600 is available in two colours, Granite Black and Chrystal White.

TV quality Video playback (30 fps) is supported.

Internal memory

The total memory is 128 MB RAM.

Memory Stick Micro™ M2™

M600 is supplied with a 64 MB card and has enhanced Memory Stick Micro™ M2™ support of up to 4 GB.

Miscellaneous

Accessories

M600 supports a large range of accessories, please see the white paper for a list.

Manuals

User Guide and Quick Guide for M600 will be available on the Internet:

www.sonyericsson.com/support

Languages

Additional languages for M600 will be available on the Internet:

www.sonyericsson.com/support

Related information

Documents

P990 User Guide

P990 White Paper

M600 User Guide

M600 White Paper

Links

www.SonyEricsson.com

www.SonyEricsson.com/support

www.SonyEricsson.com/developer

www.ericsson.com/mobilityworld

www.bluetooth.com

Trademarks and acknowledgement

BLUETOOTH is a trademark owned by the Bluetooth SIG, Inc.

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Product overview

M600 is a compact smartphone, with an innovative design. M600's main focus is messaging, offering Push email functionality and high speed, full screen access for browsing.

M600 uses multitasking to allow you to perform several actions at once, such as, talk and browse the web, or download music and watch video clips.

For PC synchronisation or transferring files between the phone and a computer, a USB cable is provided in the kit.

Key functions and features

Function or Feature	M600 support	Page
Operating system	Symbian OS™ V9.1 Platform, including OMA DRM and platform security.	59
MMI	UIQ 3.0.	60
Size	105 x 15 x 54 mm	65
Weight	112 g with battery	65
Screen	2.6" Large QVGA (240 x 320 pixels) touch screen with 262 k colours that supports landscape view for imaging and browsing.	65
Colour	Granite Black and Chrystal White.	65
Processor	ARM9.	65
Talk time	GSM up to 7.5 hours UMTS up to 2.5 hours	67
Stand-by time	GSM up to 340 hours UMTS up to 250 hours	67
Interaction	Using touch screen, dual function keyboard, 3 way Jog Dial and softkeys.	22
3G	✓ UMTS, video and 3GPP streaming.	56
Bluetooth™ Wireless Technology	✓ 2.0, includes car handsfree profile.	43
Infrared	✓ SIR	44
USB	✓ High speed	45
UMTS	✓ E-GSM 900. GSM 1800, GSM 1900 and UMTS 2100.	66
Media player	✓ supports playback, streaming and playlists.	34
Activity menu	✓ Customisable top level menu giving rapid access to M600 features.	23
Upgradeable	✓ via the Sony Ericsson Update Service.	52
Data transfer speed	High speed 12 Mbps.	48
Browser	✓Opera browser that supports frames and javascript™.	39
Push email	✓ prepared for major providers.	31
Messaging	SMS, MMS, EMS and email.	31

Internet wizard	✓	51
PIM applications	Contacts, Calendar, Tasks, Notes, Sound recorder, Time and alarm clock, Stop watch, Converter, Calculator, and UTC support.	27
Multitasking	✓ allows several applications to be open at once.	23
Viewers	Microsoft® Excel, Word, Powerpoint®, and Adobe® PDF.	32
Editors	Microsoft® Word, Powerpoint®, and Excel.	32
Themes	Easy personalization of animated icons, screensavers, wallpaper and skins.	53
Speaker phone	✓	26
Memory stick™	✓ Memory Stick Micro™ M2™ slot for up to 4 GB removable memory. 64 MB supplied with M600.	41
Flight mode	✓	22
Local synchronisation	✓ via SyncML.	48
Remote synchronisation	✓ via SyncML.	48
Business telephony	✓ with SIP-signalling to server.	26
Games	Vijay Singh Pro Golf 2005™; QuadraPop.	39
Additional applications	RSS Reader; MusicDJ™; PlayNow™ 2.0.	38

Controls and operation

M600 overview

The Activity menu automatically appears on the screen once the phone has started. The Activity menu gives rapid access to the phones commonly used features. See “Activity menu” on page 23 for more details.

Flight mode

GSM or Bluetooth™ connection from a mobile phone may be harmful to the safe operation of an aircraft.

Flight mode is a special mode in which the phone does not transmit signals, but allows the user to browse, read and write information.

Text input methods

There are three text entry methods in flip closed:

- The dual function keyboard located below the screen. The enhanced dual function keyboard features navigation and TAB keys to help when filling in text fields. The new backlight evenly lights up the dual function keyboard. 4 keyboard types supported.
- The virtual keyboard located at the top of the screen, when available.
- Write directly on the screen using the stylus.

Text options supported are:

- Add symbol.
- Input type (ABC, abs, Abc or 123).
- Auto capitalization.
- Predictive text input.
- 1st language.
- 2nd language (when predictive text is selected).
- Spell word (when predictive text is selected).
- My word (when predictive text is selected).
- Word suggestion (when predictive text is selected).

Enhanced text prediction

You can use Enhanced text prediction when inputting in all three methods: dual function keyboard, Virtual keyboard and Handwriting recognition. The primary word or next word prediction suggestion is presented where you are writing; additional suggestions are presented in a pre-edit box at the top of the screen. If you mistype or misspell a word, the pre-edit box may also suggest closely matching words in your selected language dictionaries, words you may have typed previously, or items that you have put into your ‘My words’ personal dictionary.

Note: While entering text, you have the option to either select any of the word suggestions displayed, or to ignore them and continue entering text via your chosen method. If a prediction suggestion is shown when you are sending/saving the input text, this word will not be sent/saved.

Long press on spacebar

A long press on the hardware spacebar launches the virtual keypad.

Activity menu

The Activity menu is displayed when M600 starts.

The Activity menu acts as the starting point for tasks performed on M600, it does this by linking to the feature rich applications of the phone.

The Activity menu is highly customisable, just about every aspect of its appearance, content, navigation methods and behaviour can be changed.

Multitasking

It is possible to have several applications open on M600 at any time. An open application can either be closed, using the back key or simply left open.

Selecting Task Manager displays a list of open applications. To return to an open application select it from the Task Manager or the Application list.

Editing features to move text from one application to another can be used.

Models

Standard M600

- Europe, Middle East, Americas, Latin Asia
- Latin characters (a, b, c…) on the keyboard and numeric keypad
- Russian numeric keypad available
- Flip closed input by Zi-Corp and eZiText
- Latin character handwriting recognition

M600c

- People's Republic of China
- Chinese keypad, Pinyin and Strokes input method
- Latin and Strokes characters on the keyboard
- Chinese handwriting recognition
- Client for online Chinese dictionary
- Lunar calendar

Technologies in detail

This chapter offers a detailed description of the technologies available in this product.

Phone applications

The following call features have been added to M600:

- In call menu: M600 has a dynamic in call menu that changes to help the user perform actions quickly and simply.
- Accept Calls: users can specify which calls to accept and which calls to rejected.
- Rich call functionality: M600 allows SMS, MMS, and contact cards to be easily sent during a call.
- Call notes: M600 can launch Notes whilst a call is ongoing. The note is automatically named with the other party's number, name (if known), time of call and date. The user can start writing in the note immediately.
- Follow up call: M600 can automatically create follow up call tasks. The task contains the phone number, contact name, time of call, and date of call.
- Speakerphone.

Business telephony

Corporations have traditionally used fixed-line and DECT phones in the office, but now there is a strong trend towards the use of mobile phones to access business telephony features. Of prime importance, however, is that users can still access the features and functionality of their corporate communication system, no matter which phone they are using. M600 can interact with the following corporate systems:

- A Corporate switch PABX, (Private Automatic Branch Exchange), equipped with a mobile extension port, (like the Ericsson MD110 and BusinessPhone).
- The mobile centrex service, if provided by the operator.
- Telephony server located at the operator's or customer's premises.

Feature buttons

The user activates corporate features by selecting commands from a list, which can be dynamically sent by the server via an IP link, or pre-configured by the company's IT manage, the operator or a service provider. Each command displays a text description of the function.

When a command is selected, pre-configured DTMF tones are user to communicate the desired function to the server. The phone can even be used to send data that the user is prompted to provide, such as the date they will be back from a business trip. Feature commands and text descriptions have to be programmed using XML and then imported into the phone.

In-call features are reached from the active call view.

Offline commands and corporate telephony settings can be accessed by pressing the 'corporate telephony' icon once a calling card has been set up. Activating a commands will result in an IP packet being sent to the server.

Routing of corporate calls

If a company uses a PABX, calls must be routed via the PABX to gain access to corporate features and resources. M600 can route outgoing calls to the corporate switch, instead of to the dialled B-party. To complete a call, the B-number is then sent to the mobile extension port of the PABX and the call set-up is completed. This process is completely transparent to the user.

A user may dial either an internal number, such as, 1234, or a public number, like +468 123 4567. M600 can be set to bypass the switch for certain types of calls.

Configuring the phone for the company

The person responsible for the corporate communication services defines how the phone shall be configured. This may be the company's IT manager, the operator or a service provider. They define what feature commands shall be displayed in the phone, how these commands interact with the PABX and what text is displayed. They also define how M600 should handle calls to and from the corporate switch. This is all done in an XML-structured configuration file, with the extension .pbx. Once created, this configuration file can be easily installed onto M600.

To ensure that only authorized personnel have access to the PABX, approved mobile phone numbers are added to the list of mobile extensions in the PBX, and only these numbers will be able to use the facilities available.

For more information please go to www.SonyEricsson.com/professionalsolutions and look for “Areas of use”.

PIM applications

Contacts

M600 Contacts application holds the details of all the user's contacts. It is fully integrated with the phone and other PIM applications. Each contact can contain multiple phone numbers and email addresses, names, addresses, birthday details, anniversary details, personal notes and a picture or photograph. Most of this information will typically be transferred to M600 when it is synchronized with a PC application such as Microsoft® Outlook® or Lotus Notes. Contact data can also be added and edited on M600. Local and remote synchronization is possible using the SyncML standard; see “Synchronisation and data transfer” on page 48 for more information.

Data can also be beamed to and from M600 using infrared and Bluetooth™ connectivity. It can also be sent and received using Messages. See See “Object exchange - 'send as'” on page 51 for more details.

Contacts are displayed in a list, which may be filtered by folder such as business or personal. To see a contacts details select the contact. Tap the icons alongside the contacts details to launch a phone call, a new message or a URL in the browser.

Calls received from new numbers can automatically cause the user to be prompted to save the number.

Contact details can be added to a distribution list. Distribution lists can be used to send groups of contacts the same email, SMS, EMS or MMS.

Calendar

The Calendar application keeps track of appointments and events and enables reminder alarms to be set. The calendar view has been enhanced to display the selected day’s events on the screen.

Calendar entries are displayed in local time, but all appointments and reminders are saved in UTC (Coordinated Universal Time). If the user moves to a different time zone the calendar updates the appointments and reminders automatically. Meeting requests can be sent from the Calendar application via email. Meeting invitations can be received by email and added in to Calendar.

The alarm signal can be personalized using sound clips. Appointments can be shared using infrared, Bluetooth™ connectivity, and also by Messages. Local and remote synchronisation are both supported using SyncML; see “Synchronisation and data transfer” on page 48 for more information. The Chinese models support the lunar calendar.

Tasks

Tasks is a simple yet powerful application that can be used to make reminder notes. Task items may be beamed, exchanged using Messages, synchronized locally, and remotely using SyncML, see “Synchronisation and data transfer” on page 48 for more information.

Notes

Notes provides a quick means of making notes in either text or sketch format. Notes can be launched during a call. The note is automatically named with the other party’s number, name (if known), time of call and date.

Time and alarm clock

Time is a sophisticated alarm clock, which can show the time both locally and in another time zone. If the user swaps the local time zone to the other specified time zone the local time zone is automatically displayed in the second time zone area. Alarms can be set. The alarm signal can be any supported sound that is stored on the phone or inserted Memory Stick™.

Sound recorder

Sound recorder is a simple screen-driven dictation machine with the added advantage that recordings can be beamed and exchanged via Messages. Sound recorder can also:

- Record a personal ringtone.
- Make changes to existing recordings.
- Rename recordings.
- Save recording to the phone or Memory Stick™.
- Delete recordings

Calculator

Calculator has the features of a standard desk calculator, and is always available from the application launcher.

Stopwatch

Stopwatch can be instantly started and stopped to measure an exact duration of time. The stopwatch continues to run when a call is answered. The stopwatch can run in the background if the application is closed, an icon is displayed in the status bar to show that it is running. You can time and record up to 9 events.

Converter

Converter helps you to convert the following measurements; Distances, Volumes, Weights, Temperatures, Speeds, Areas and Currencies.

Speed dial

The user can launch the following features from picture speed dial:

- A call.
- The entry in contacts.

Messaging

Email

M600 supports the following standards:

POP3	POP is used to retrieve and delete messages from an incoming mail server in the network
IMAP4	IMAP is also used to copy, retrieve, move and delete messages from an incoming mail server. IMAP has more features than POP such as remote folders. IMAP4 also offers support for the IDLE command, which if supported by the server, offers push capabilities.
SMTP	SMTP is used to send messages from a mail client to a mail server.
MIME	MIME is a format that describes data, such as, defining the attachments included in email.

Most of the standards above are supported by Internet Service Providers and many corporate environments. M600 is supplied with an Internet wizard which helps users to configure an account. OTA (Over The Air) configuration of email and ISP accounts is supported.

M600 supports SSL and TLS encryption.

Automatic polling can be used so that email is automatically collected and presented in the Inbox. Controls are provided to filter messages based on size, enabling cost and download time to be managed.

Another option enables only email headers to be presented in the inbox. Headers are quick to download. The user may read and select headers and request the message to be downloaded if necessary.

If IMAP4 is used you can enable the IDLE command to keep connected to the email server. This allows the server to push new messages directly to the M600 as they arrive.

Email transmission is performed in the background, making it possible to perform other messaging functions during transmission.

A list of recently used addresses are available when creating a message. M600 allows distribution lists to be created and sender ID information is sent with message alerts.

M600 can send any type of attachment, including the following:

- Pictures.
- Video clips.
- Audio files.
- SIS files.
- JAR/JAD files.
- Themes.
- vObjects (vCalendar, vCard, vNote, vBookmark).
- File produced in the document editors.

Attachments may be viewed using the pre installed viewers for Microsoft® Word, Excel, PowerPoint and Adobe® Acrobat® (PDF). See “Quickoffice®.” on page 32 for more information.

A signature may be set up so that essential details are automatically copied to the end of each outgoing email.

The supplied Sony Ericsson PC Suite enables email to be synchronized with Microsoft® Outlook® and Lotus® Notes®. During synchronization, new

email from the PC is transferred in to the corresponding 'synchronized email account' inbox on M600. Messages and replies written using this account on M600 are transferred and sent via the PC.

Web based email can, of course, be accessed using the M600 browser.

Email folders

Messaging accounts have the following folders: Inbox, Outbox, SIM, Draft and Sent. You can create additional folders if you want,

see Local folders below.

Local folders

To improve the organization of your folders you can create more folders locally on M600. Local folders are only visible in the Messages application. Local folders cannot be created on the Memory Stick™.

Push email

Push email is a method of 'pushing' or forwarding email to mobile devices as soon as a message reaches the email server. These solutions may also include calendar and contacts synchronization. Push email solutions allow email messages to be delivered in the background in the same way as SMS or MMS.

M600 is prepared for these solutions and a rich set of 3rd party applications are available from companies, such as Extended Systems, Intellisync, JP Mobile, Research In Motion (RIM)/Blackberry, Active Sync, Seven, Smartner and Visto.

Push methods

The solutions use different methods to push the messages, usually IP push, by listening to dedicated ports when a session is active, this is similar to instant messaging solutions. Some solutions may also use SMS with triggers to the application to start a sync/download, sometimes referred to as pseudo-push.

Security

All solutions use end-to-end security using SSL, 3DES or AES encryption. Most solutions are based on using a fixed password for push mail. Initially key exchange is also done by using device parameters such as the IMEI number. A few solutions combine push with one-time passwords that are limited for a certain amount of time before being re-entered. Many solutions have functionality for enforcing screen passwords. There is also sometimes theft and loss protection through wipe-out commands and lock-out.

Unified mailbox

SMS, EMS, MMS, Local Information, Beamed and Autoconfig messages are all stored within one unified inbox in messaging.

- SMS (Short Message Service): With SMS a user can send text messages containing up to 160 characters to and from GSM mobile stations (up to 70 characters using unicode text). M600 also provides concatenated SMS, that is, the user can write a longer message and M600 will automatically send it using more than one SMS. You can reply to an SMS with an MMS and send a fax using SMS as the bearer. There is enhanced support for delivery reports and short message class support.
- Local Information, Automatic configuration items, beamed items will be found in the Inbox.
- Enhanced Messaging Service (EMS) adds powerful functionality to the well-known SMS standard. An EMS can include; sounds and

melodies, pictures and animations and formatted text. EMS message can be sent as concatenated messages.

- MMS messages may include combinations of video clips, animation, pictures, sound and text. The following tasks can be performed from an MMS; smart uploads and downloads, automatic transmission when leaving Flight Mode, record video directly from the MMS application, background transmission, direct links, these are customized shortcuts to operators web site to get new templates and reply to an MMS with an SMS.

Area Information

Area information is SMS Cell Broadcasting.

An SMS cell broadcast allows information to be sent to all mobile handsets in a particular geographic area. Information such as traffic news or local weather reports can be sent to an area covered by a single cell or to the entire network.

Broadcast messages are organised into a number of channels, this allows different types of messages to be broadcast on different channels. Using the phone, users can choose which broadcast channels to subscribe to. The requested text messages are received, the message either scrolls across the standby screen or is placed in the Inbox. The user can choose if they want to save the message to the Inbox or not.

Broadcast subscriptions are controlled from the Area information dialog.

When a user is subscribed to channel 50, and this channel is supported by their network, the ID of the current cell (or group of cells) is displayed underneath the network operator name in the phone display. This is often the telephone area code or postal code of the current location.

Quickoffice®

Quickoffice® is an application that can be used to view and edit Microsoft Word, Excel, PowerPoint and text documents. It can also be used to create new documents and spreadsheets.

Quickoffice scans M600 and displays a file manger which lists all compatible files (.xls, .doc, .ppt, and .txt) depending on where they are on the handset (you can select to search the internal memory, Memory Stick™, or email). The file manager view can be changed to only display files that are compatible with one of the support programs.

From the file manger you can delete, move or copy documents, create new documents, and open existing ones. You can also send documents using any of the methods available on the device (email, MMS, IR, Wi-Fi or Bluetooth™ connectivity).

Quick office is localised into English, Italian, German, French and Spanish.

Quickword®

Quickword allows you to view and edit word processing documents saved in standard .DOC format on M600. PC format email attachments can be opened directly on the device without the need for conversion at a PC, edits to existing documents can be made.

Documents can be transferred to and from M600 using email, MMS, infrared, Bluetooth™ connectivity, Wi-Fi or a Memory Stick™. Quickword opens files created with Microsoft Word 97, 2000, XP and 2003 that are saved in Microsoft .doc format.

When a document is opened for editing, a copy of the document is created so that the file is intact. When saving a file, Quickword creates a native Microsoft Word file.

Key Features

- Refined user interface for easier document editing and viewing.
- Multiple Undo and Redo commands including cut, copy, paste and formatting functions.
- View tables embedded within documents and edit the text (*tables are displayed in a single column format for easier viewing on M600, actual table format of the document is not affected).
- MS Word compatible paragraph and style formatting.
- Advanced text formatting and full font control including typeface, size, bold, italics, superscripts, subscripts and underline.
- Open, view, edit and create both .doc (MS Word) and .txt (text) files.
- Edit Word documents, and forward to colleagues just as you would from your desktop PC or laptop.
- ZoomView™ lets you pick the display size best for you.
- Quick navigation through documents.
- Colour support and colour picker for changing font colours.
- Keyboard support for folding portable keyboards and on device text entry.
- Format paragraphs with left, center and right text justification.
- Portrait and landscape mode supported.
- Cut and paste text, undo edits, and more.
- Edit-protect mode prevents editing or making alterations while reviewing documents.

Quicksheet®

Quicksheet is a full function spreadsheet with Microsoft Excel® compatibility.

Quicksheet opens files created with Microsoft Excel 97, 2000, XP and 2003 and saves in Microsoft .xls format.

Key Features

- Features the most frequently used scientific, financial, statistical, date & time, lookup and aggregate Excel functions and sorting.
- Multiple sheets per workbook and sheet linking.
- Advanced cell editing features that allow to you create and modify spreadsheets easily. Permits cell formatting in a number of different ways.
- Quickly sort data and lists.
- Find and Find/Replace functions.
- Cell and font colour formatting.
- Column resizing, row and column freezing.
- Portrait and landscape mode supported.
- Saves changes as a native Excel file that can be sent via IR beaming, Bluetooth, Wi-Fi, USB or email.

Quickpoint™

QuickPoint allows you to view and edit Microsoft PowerPoint® presentations. The application is compatible with MS Office 97, 2000 and XP. It allows a variety of modes for viewing such as slide, notes and outline views.

Key Features

- Edit slide text in Outline view and show the changes in the Slide View.
- Edit speaking notes.
- Edit PowerPoint presentations and forward to colleagues just as you would from your desktop PC or laptop.
- Advanced viewing includes three views:
  - Outline View;
  - Slide View;
  - Speaker Notes View.
- View & edit PowerPoint slides and notes.
- Zoom in and out.
- Portrait and landscape mode supported.
- Saves changes as a native PowerPoint file that can be sent via IR beaming, Bluetooth, Wi-Fi, USB or email.
- Give presentations right from your M600 with iGo® Pitch Duo™ display accessory or remotely control a PC.

Pdf+

Pdf+ is a viewer for Portable Document Format (or PDF) files. Pdf+ reads and displays standard PDF files, without the need for conversion on a PC to a proprietary format.

With Pdf+ you can:

- View the text, line drawings and bit maps in the document.
- Browse the document, and go to a specific page.
- Wrap the text to make it fit the screen.
- Zoom in and out to maximize the amount of text and graphics you can read on the screen.
- Hide the title and the status pane to maximize the viewing area.
- Search for strings in the text of the document.
- View and follow bookmarks.

- Follow links to other pages in the document.
- Follow URLs if you have the web browser installed.
- Read files protected with a user password.

The 'wrap' view displays the document so that as much text as possible is visible on the screen. Images and line drawings are not visible in this view. Pdf+ can display a large number of PDF 1.0, 1.1, 1.2 and 1.3 files.

Limitations:

*Pdf+ doesn't handle the dynamic content of a PDF file, such as hypertext links.

*Pdf+ cannot render Type 0 and Type 3 fonts.

Document types supported

Document type	Features
Adobe® Acrobat® (PDF)	Viewer
Microsoft® Excel	Editor
Microsoft® PowerPoint®	Editor
Microsoft® Word	Editor

Picture Gallery

The Picture Gallery enables you to view, send and organize your photographs. The Picture Gallery supports image types JPEG, BMP, GIF (including animated), MBM, PNG, and WBMP in 262 k colours. You can also launch the Picture Editor from the Picture Gallery.

Picture Editor

Using the Picture Editor, it is possible to crop, rotate and resize images. The editor also includes fun layers, clip art and tools for drawing on the image using the stylus. Different pen sizes and colours are available, as well as a text tool for formatting and inserting text into the image. When creating MMS messages, the Picture Editor is used for editing inserted JPEG, PNG, GIF and BMP images as well as for creating simple JPEG image. A simpler version of the Picture Editor is used for creating images for EMS messages.

Entertainment/multimedia

Media player

From the Media player the user can access three media functions:

- Music
  Select to access music tracks. Songs may be collected in numerous ways, including Internet download, file transfer from the PC and via the Memory Stick™.
  Music can be organize and listen to on the M600. Music is grouped by Album, Artist and track in the music library. The Tracks view displays all the music available. Tracks can be added to the music library manually.

- Video
  Select to access video clips.

- Online
  Access saved bookmarks to music and video's.

The Media player features an equalizer with predefined settings like MegaBass, Pop, Classical. It supports different audio and video formats, streaming, download and playback.

The Media player is intelligently aware of other applications in M600, playback is paused when a telephone call is made or received.

Playlists

One of the most central Media player features is the use of playlists. This feature allows users to create their own 'collections' of songs and gives easy access them. It is possible to create, sort or manage playlists using audio files that are stored on the Memory Stick™ or in the phone memory.

To avoid including ringtones in the music library you can specify content that should be excluded. Pre installed ringtones are already placed in a separate ringtone folder.

Play modes

The Media player has two different play modes: shuffle and loop.

- Shuffle plays a randomly selected file from the current playlist. Played files are de-selected and not repeated.
- Loop restarts the playlist when the last item in the list is reached.

DRM protection

In M600 the following types of DRM protection are used: FWL (Forward Lock), CD (Combined Delivery) and SD (Separate Delivery). All protection types can be applied on MP3, AAC and MPEG4 files. See "DRM" on page 52 for more details.

All protection types can be applied to all types of multimedia content such as audio, video, images and Java midlets.

Ringtones

Ringtones can be played in the Media player. Any file in a supported audio format can be used as a ringtone as long the operator has not disabled that format for ringtone use.

Ringtones can be downloaded using PlayNow™ or created using MusicDJ™.

Streaming

Media player content is streamed using RTSP (Real Time Streaming Protocol) session control according to 3GPP specification.

Audio support is ACC, AAC-LC and AMR-NB according to 3GPP.

3GPP specifies the following codecs:

- H.263 Profile 0 Level 10.
- MPEG-4 Visual Simple Profile Level 0-3.
- H263 Profile 3 Level 10.

M600 supports the codecs formats as well as:

- Real Audio.
- Real Audio Video.

Media formats

Audio formats

Format	Description
AAC-LC	Advanced Audio Coding. AAC is the latest audio coding standard, defined in the MPEG-2 standard and is used for high-quality audio compression. AAC provides higher quality than MP3 at the same bit rate, or for the same audio quality it uses a 30 per cent lower bit rate. It supports the coding of multichannel audio, with up to 48 main channels and 16 low-frequency channels. The AAC offers three different profiles to facilitate trade off between quality, memory and processing power requirements. They include: Main Profile (MP), Low Complexity (LC) and Scalable Sampling Rate (SSR). The Media player can play AAC-LC format audio which is encoded into an MPEG-4 file or stream. The Sound recorder use the AAC-LC format for recording.
AMR-NB	Adaptive Multi Rate. AMR-NB is a speech compression format that is highly optimized for the mobile environment, requiring as little as 4.75 Kbps bandwidth. AMR-NB is used to convey voice recordings in MMS, 3GPP video clips or streams. M600 records AMR using 12.2 Kbps with a sample rate of 8 kHz.
AU	Similar to WAV, this is an audio format commonly used in the Macintosh, Unix and Java™ worlds. It is not commonly used for content on mobile devices.
iMelody	A format commonly used for monophonic ringtones. (M600 ringtones can use up to 40 voices.)
MIDI	Musical Instrument Digital Interface. MIDI is not a recording of music, but a description which enables a local synthesizer to play the music from the instructions included in the MIDI file. Since a MIDI file only represents player information, it is far more concise than formats that store the sound directly. An advantage is very small file sizes. A disadvantage is the lack of specific sound control. MIDI is ideal for polyphonic ringtones. (M600 ringtones can use up to 40 voices.)
SP-MIDI	SP-MIDI stands for Scalable Polyphony MIDI. SP-MIDI is based on the MIDI format and adapted for mobile phones and other portable products. The objective is to secure interoperability between products with different sound capabilities. Initial recommendations for using SP-MIDI in 3GPP™ applications are discussed in a separate document, *Scalable Polyphony MIDI Device 5-24 Note Profile for* 3GPP™*.*
MP3	MP3 is the file extension for MPEG audio layer 3. Layer 3 is one of three coding schemes (layer 1, layer 2 and layer 3) for the compression of audio signals. Layer 3 uses a very efficient compression method, removing all irrelevant parts of a sound signal that the human ear cannot perceive. The result is, CD digital audio (CDDA) is converted to MP3 with almost untouched quality, compressed by a factor of around 12. The high compression of audio in MP3 files makes them relatively small, though MP3 files can be created with different size and quality compromises. The small file size, together with the excellent sound quality, are the main reasons for the MP3-format's massive popularity when sharing music over the Internet.
RMF	Rich Music Format™. A file format developed by Beatnik combining the compact size of MIDI files with the high quality of sampled sound.

WAV	A wave file is identified by a file name extension of WAV (.wav). Used primarily in PCs, the wave file format has been accepted as a viable interchange medium for other computer platforms, such as Macintosh. This allows content developers to freely move audio files between platforms for processing. In addition to the uncompressed raw audio data, the wave file format stores information about the file's number of tracks (mono or stereo), sample rate, and bit depth.
XMF	Xtended Music Format XMF is a technology for collecting other music and sound resources, such as Standard MIDI Files, DLS instrument files, WAV or other digital audio files. XMF does not describe musical notes, notation, instrument sounds or audio recordings. Instead, it allows content creators a method to collect all those elements and put them in a single file. In the end, this means easier handling and more consistent predictable playback.
DLS	The DLS file format is used to store both the digital sound data and articulation parameters needed to create one or more 'instruments.' An instrument contains 'regions' which point to WAVE 'files' (samples) also embedded in the DLS file. Each region specifies a MIDI note and velocity range which will trigger the corresponding sound and also contains articulation information such as envelopes and loop points. Articulation information can be specified for each individual region or for the entire instrument.”
Real Audio 9	RealAudio is a proprietary encoding format from RealNetworks. It also supports repositioning during real-time playback.
eACC+ (EACC+, ACC+ V2)	eACC+ is ACC+ with the addition of Parametric Stereo (PS). PS significantly increases the codec efficiency for low bit rate stereo signals.
ACC+ (HE ACC, ACC+)	‘High-efficiency ACC’ is the official MPEG name for the combination of ACC and Spectral Band Replication (SBR). SBR is a bandwidth extension technique which enables audio codecs to deliver the same quality at half the bit rate.

Video formats

Format	Description
MPEG-4 ISO File Format (.mp4), ISO/IEC 14496-14, including MPEG-4 AAC-LC and AMR-NB audio.	File formats that are specified as a part of the ISO/IEC MPEG-4 international standard. It is used to store media types defined by the ISO/IEC Moving Picture Experts Group, and can be used to store other media types as well. It is, typically used to store data in files, though it will be used in data streams and possibly in other ways. *.mp4 allows multiplexing of multiple video and audio streams in one file, variable frame- and bit-rates, subtitles and still images. It also allows streaming over the Internet.
3GPP File Format (.3gp), 3GPP TS 26.234 V5.6.0, including MPEG-4 AAC-LC and AMR-NB audio	File formats which are used in mobile phones to store media (audio/video). This file format is a simpler version of "ISO 14496-1 Media Format”. This format can only carry video encoded as MPEG-4 or H.263. Audio is stored in AMR-NB or AAC-LC formats
RealMedia	A digital sound and video file format that is the registered trademark of RealNetworks. This format is typically used to stream media through the net.

Picture Editor formats

Format	Example File Size	Description
BMP	226 KB	Microsoft ®Windows Bitmap. A graphics format defined by Microsoft® supporting 1, 4, 8 or 18-bit colour depth. No compression, so files can be very large. Used for icons and very small images.
GIF	42 KB	Graphics Interchange Format. Highly compressed by limiting the colour palette to 16 or 256 colours. GIF is therefore good for icons and diagrams. When a Note is sent as an email attachment, the GIF format is used.
GIF (animated)	210 KB (5 frames)	A GIF animation containing a number of images in a timed and repeating sequence. Some M600 applications display only the first image in the sequence.
JPEG (.JPG)	13 KB	An image compression format managed by the Joint Photographic Experts Group. The format supports various degrees of compression, enabling different quality/file-size balances to be provided in one standard. JPG files support millions of colours and are therefore good for 'real life' photographs.
MBM		Multi Bitmap. This is a Symbian OS format for colour and greyscale bitmap images.
PNG	166 KB	Portable Network Graphics. PNG compresses images with millions of colours so there is no loss of detail, but has comparatively large file size. It is not commonly used.
WBMP	23 KB	Wireless BitMap. An image format optimized for small mobile devices. M600 supports Black and White, 2-bit greyscale and 6-bit colour modes, according to ETSI 3GPP TS 23.040

PlayNow™

PlayNow™ is a unique direct-link quality music download application. PlayNow users can connect to a live list of top music hits, videos, games and pictures. Content can be previewed before purchasing.

The content available from PlayNow differs from country to country. Games can not be previewed and are only available in certain phone modes.

MusicDJ™

A sampler music tool with MIDI drum, bass, chord and accent loops in different music styles, which can be combined to create polyphonic ringtones. MusicDJ™ is touch screen enabled.

Games

Gaming on the M600 is greatly improved due to the new 3D Hardware accelerator.

Vijay Singh Pro Golf 2005

Vijay Singh Pro Golf 2005 simulates the experience of being the unseated golf champion. This game is one of the best games of golf available on a mobile. Pro Golf 2005 looks and plays like the best console golf sims of the 16-bit era.

- Choose from several golfer archetypes, ranging from the power hitter to the short-game wizard
- Take on Vijay on either nine or 18 holes.
- Choose from three difficulty levels.
- There is a standard swing meter, which uses timed button presses to determine a shot's power and accuracy.
- Aim your shot by rotating your character. The impact this has on your shot's trajectory will simultaneously be shown on a map of the hole.
- Putting uses a familiar meter as well, and it takes place on a wire-frame grid, the purpose is to impress you with the complexity of golf's short game.

In every shot situation, the control feels pretty tight, and there's a distinct difference between clubs. If you want to chip your way out of a bunker, you'd better use a sand wedge. This sort of realism is a must in the simulation category.

This very polished-looking 2D title seamlessly shifts between camera angles. Your viewpoint will shift at least twice on every stroke, highlighting different parts of the shot. In this way, Pro Golf 2005 does a better job of approximating the presentation of televised golf than its 3D competitors.

Qudrapop

Qudrapop is a java™ based game. Qudrapop is a simple yet addictive game. To make an item disappear, you need to have at least four items of the same kind in connection with each other. The more items that disappear at the same time, the higher the score. During the game, blocking items may appear, to make it harder for the items to connect. A blocking item will go away only if an item next to it disappears.

Browser

M600 features the integrated Opera 8.0 browser.

The Opera browser has been designed to display practically all Web pages on the Internet. The browser supports the de facto HTML standard “street HTML” (used by most Web developers), JavaScript™, Frames, and the ability to add plug-in applications. This means that the users can access their favourite Web pages. The Opera browser is primarily an HTML browser.

Users can quickly and easily switch between portrait and landscape presentation as well as change from a normal view with scroll bars to a full screen view. The user can use pen motions to slide the page on the screen.

Users can select fit to screen to reformat pages to fit inside the screen width and eliminate the need for horizontal scrolling. (Small Screen Rendering is supported)

Some key features:

- Tap and hold on a bookmark to display the page in a new window.
- Tap and hold a link to view a context-sensitive menu of alternative actions: an http: link would give the options Open, Open in new window, Open in background and Send as.
- Secure downloads manager that is especially useful for downloading commercial media objects that need to be paid for.
- Pages can be saved for offline viewing.
- All private data can be cleared with one command.

- Built-in pop-up blocking.

Browser security

M600 supports the TLS/SSL to provide a secure encrypted link between the browser and the web site. This method is commonly used for secure transactions on the web. An icon in the display indicates when a secure connection is in use.

TLS Security

When using certain Internet services the user may require a secure connection between the phone and the web site, such as, when using banking services. An icon in the display indicates when a secure connection is used. M600 is based on the WAP 2.0 specifications where security functionality is specified with a technology called WAP TLS Profile (Wireless Application Protocol Transport Layer Security).

The Internet protocols that handle the connection, its transport and its security are structured in protocol layers. The security is handled by the TLS layer operating above the transport protocol layer. There are three TLS classes that define the levels of security for a TLS connection:

- Anonymous TLS involves encryption with no authentication.
- Server authentication involves encryption with server authentication.
- Client authentication involves encryption with both server and client authentication

Server authentication	Requires a server certificate stored at the server side and a trusted certificate stored at the client side.
Client authentication	Requires a client certificate stored at the client side and a trusted certificate stored at the server side.

Certificates

To use secure connections, the user needs to have certificates saved in the phone. Certificates can be downloaded and installed when required. There are two types of certificates:

Certificate authority	A trusted certificate used to verify that a web site is genuine. If the phone has a stored trusted certificate of a certain type, it means the user can trust all web sites which present a certificate that can be verified by the trusted certificate. Certificates are preinstalled in the phone and can be downloaded from the trusted supplier's web page.
User certificate	A personal certificate that verifies the user's identity. A bank that the user has a contract with may issue this kind of certificate.

M600 is preinstalled with X.509 certificates from Baltimore, Entrust, Geotrust, GlobalSign, GTE Cybertrust, RSA, Sony Ericsson, Thawte and VeriSign.

RSS feeds

RSS provides a way for web sites to distribute their content outside of a web browser. A news web site might have an RSS feed which contains breaking stories, while a magazine web site may provide an RSS feed with excerpts of their latest articles.

An RSS feed is a file containing a list of news items, each of which has a title, a description and a URL link to read more on the content provider's web site.

With the RSS Feeds application the user gets information from the Internet into an easy-to-view format without browsing the web sites. The user can browse information from dozens - or hundreds - of web sites without ever visiting them.

RSS Feeds includes the following features:

- Subscription.
- Update feeds manually or via a predefined schedule.
- Organize feeds into folders.
- Read news items.
- Send a news item to another device via email, SMS, MMS, Bluetooth™ connectivity or infra-red.
- Link to more information via the web browser.

Connectivity

Memory Stick Micro™ M2™

SanDisk Corporation and Sony Corporation have teamed up to develop the new Memory Stick Micro™ M2™, an ultra-small IC recording media designed to meet the growing storage needs of highly compact, multi functional mobile phones. Licensing for the development of Memory Stick Micro™ M2™ compatible hardware only started on October 3rd, 2005.

Memory Stick Micro™ M2™ is approximately one-quarter the size of Memory Stick™ PRO Duo media, yet only about 1.2 mm thick. The media's edges are slotted lengthways to allow for more slim-line designed connectors to reduce space in host devices. As dual-voltage media, Memory Stick Micro™ M2™ supports devices operating at 3.3 volts and 1.8 volts. The Memory Stick Micro™ M2™ incorporates Sony's MagicGate copy-protection mechanism.

Dimensions	15 x 12.5 x 1.2 mm
Volume	225 mm^3
Connector Pin	11-pin
Maximum Capacity	4 GB
Max. Data Transfer Rate	160 Mbps
Operating Voltage	1.7 - 1.95 V and 2.7 V 3.6 V
Interface	Serial interface and 4-bit parallel interface
Operating Temperature	-25 ~ +85^oC
Copyright Protection	MagicGate

M600 supports the Memory Stick Micro™ M2™, it provides a convenient way of adding storage and other functions to the phone. A 64 MB Memory Stick Micro™ M2™ is supplied with M600 and sizes of up to 4 GB are supported.

A Memory Stick Micro™ M2™ can be plugged into any standard size Memory Stick™ slot using a Memory Stick Micro™ M2™ Adaptor. The Memory Stick™ has full electrical and file system compatibility.

PC and Apple Mac support

PCs and Apple Macs may be enabled for Memory Stick™ via built-in Memory Stick™ slots, Floppy Disk adaptors, PC Card adaptors, USB adaptors and even a Memory Stick™ enabled mouse. (Memory Stick Micro™ M2™ Adaptor is required)

Industry support

Memory Stick™ is supported by a wide range of companies including major names in consumer electronics, computing, automotive, mobile phone, photographic and semiconductor sectors of industry. As of December 2005, 588 companies have declared support at www.memorystick.com.

Memory Stick™ compliant products include PCs, PDAs, digital cameras, portable music players, printers, projectors and entertainment robots. Future applications include home and car audio, game machines and multimedia kiosks.

Memory Sticks are currently marketed by Sony, SanDisk, Lexar Media, I-O Data Device Inc. and Apacer Technology. As of February 2004, there were already over 60 million Memory Sticks in use worldwide. This is expected to reach 200 million in 2005. (Source: www.memorystick.com)

Memory Stick™ in the M600

Here are some examples of how Memory Sticks can be used with M600:

- Transfer images to other image-aware devices such as PCs and printers.
- Transfer data and media (sound, pictures, video clips, documents etc) between the M600 and a PC or Mac.
- Backup copies of important files can be stored on the Memory Stick™.
- New applications can be installed from a Memory Stick™.
- Third party applications can make use of Memory Stick™ storage.
- Transfer data using the USB cable between the Memory Stick™ in M600 and a connected PC.
- Personalize M600 using media on a Memory Stick™.
- Use media on a Memory Stick™ when composing MMS messages.

Specifically, the following built-in applications are able to work with the Memory Stick™: images and video, Media player, Email (attachments), Viewers and Editors (such as QuickWord), MMS (media), Browser, Phone (ringtones, screensaver), Contacts (pictures of contacts; ringtones).

The Memory Stick™ supplied with M600 is shipped with the following applications on it:

- Anti-Virus software (trial version).
- Firewall software (trial version).
- File encryption software (trial version).

Compatibility with other memory stick™ devices

M600 defines its own folder structure on a Memory Stick™, within a vendor-specific area and this is the only area that can be accessed by all of M600 applications, except for the File manager. The File manager may be used to move files between the M600's MMFH (Multimedia File Handling) system and folders placed on the Memory Stick™ by other devices, thus allowing files to be shared between M600 and other devices.

Memory stick™ connected to a PC

The Memory Stick Micro™ M2™ may be inserted into a PC, or camera that supports Memory Sticks using the Memory Stick Micro™ M2™ adaptor.

Bluetooth™ wireless technology

M600 features built-in Bluetooth™ 2.0 wireless technology. Its Bluetooth power class 2, +4 dBm radio link, operates in the globally available 2.4 GHz radio frequency band, ensuring fast and secure communications up to a range of 10 metres, or more in ideal conditions. Please note that in the few countries where the use of Bluetooth wireless technology is not allowed, the Bluetooth function will be disabled. In countries where only lower output than 4 dBm or 0 dBm is allowed, the output is limited as a customized factory setting.

Bluetooth wireless technology facilitates instant connections, which are maintained even when the devices are not in the line of sight. Enhanced audio quality voice transmission is provided under adverse conditions, making it possible to use a headset connection at all times.

Using Bluetooth™ wireless technology in the M600

True wireless connection

Connect without cables to headsets, car handsfree equipment, computers/PDAs, digital still and motion video cameras and other devices.

Up to 16 added devices

The M600 identifies and maintains up to 16 devices which are displayed in a list.

Radio link

No line of sight is required; the phone can remain in a briefcase or in a pocket (whereas infrared requires line of sight).

Secure and fast

Data connection with a Bluetooth™ connectivity PC/laptop or PDA turns the phone into a modem for connecting to the Internet and for data transfer (faster than infrared or cable).

Synchronization

Fast synchronization, even without line of sight, of calendar, notes and phonebook with PC/laptop.

Business cards

Quick exchange of business cards, notes and calendar events with other phones and devices.

Imaging and music

Exchange still images and video clips with another mobile phone, a PC/laptop, and with a digital still and motion video camera. Use the M600 as a modem to send pictures from a digital still and motion video camera to an imaging server.

Exchange music files with another mobile phone and a PC/laptop. Play MP3, MIDI sent by the phone.

Enable images to be shown on a TV or other display via an accessory, such as the Bluetooth™ Media Viewer MMW-100.

Audio quality

M600 uses an algorithm that repairs lost audio packets. When needed, a new packet is inserted with content based on previous packets. This, in conjunction with the high sensitive and high output power radio will enhance the audio quality compared to a standard Bluetooth device.

File sharing

By using the Server role of the File Transfer Profile, the phone enables the user to use a computer to manage content files that reside in the phone's file system or on the Memory Stick™. Most computer Bluetooth applications provide an explorer like user interface for the file transfer service. When connecting to the phone, the computer application will show one folder for the content in the phone's file system and one folder for the content on the Memory Stick™. The content in the Games and more folder is not exposed in the file transfer server. Opening one of the folders will show a list of files related to that folder, such as, images in the Pictures folder. Using the computer application the user can now: retrieve files from phone to computer, delete files from the phone and transfer files from the computer to the phone using the normal drag and drop mechanisms provided by the computer.

File browsing

By using the client role of the File Transfer Profile, the phone enables the user to access file systems of other devices, that support the server role of the same profile. After pairing the phone with the other device, the user can connect to the other device by selecting it in the list of My devices under the Bluetooth menu and selecting the Browse option that should be available on the left selection key. If the browse option does not appear the user can select the Service option to update the phone's knowledge that file browsing is possible with this device. When the phone is connected to the file server, the user can browse the shared folders and retrieve files listed in the folders. The user can transfer files to the file server device using the normal Send/via Bluetooth option.

Media viewing

The phone can send images and sounds to a media viewer device, such as, the MMW-100 TV adaptor accessory. The user can also conveniently run a slide show on the TV showing a set of nice phone camera pictures for family and friends. The phone can connect to a Bluetooth device that can receive images, the image can be transferred to the remote screen and displayed.

Profiles

The following Bluetooth profiles are supported in the M600:

- Dial-up Networking Profile.
- Generic Access Profile.
- Generic Object Exchange Profile.
- Object Push Profile.
- Serial Port Profile.
- Handsfree Profile.
- Headset Profile.
- Synchronization Profile.
- Basic Imaging Profile.
- File Transfer Profile.
- Human Interface Device (HID) host only Profile.
- Stereo Advanced Audio Distribution Profile.
- Advanced Audio/Video Remote Conference Profile.

Remote control

The phone keypad is configured for control of a certain computer application through a special type of HID configuration file consisting of an XML file for the keypad and an image for the display. HID configuration files can be downloaded into the phone using the normal file transfer mechanisms.

Users can even modify the files themselves on their computers. A few configuration files pre-loaded in the phone enable the user to navigate on a computer desktop and control presentations and Media players.

System functions

Characteristics

The HID configuration files, and the set of predefined HID configuration files, are customizable. The configuration files can be modified by the user if transferred to, and opened on, a computer.

Used enablers and bearers

The HID based remote control function works over Bluetooth. It is possible to download the HID configuration files via Bluetooth, IR or USB. It is also possible to transfer the files to another device using Bluetooth or infrared.

Power save mode

The phone uses sniff mode on headset, handsfree and HID connections which means reduced power consumption and shorter connection set-up times.

IrDA

IrDA (Infrared Data Association) is a point-to-point communication link between two infrared ports. The infrared beam has to be directed towards the target infrared port and as long as the two infrared ports are within sight and range, the devices can exchange data.

Object Exchange via infrared (IrObex) supports transferring objects between compatible phones. You can use M600 to control electrical devices that have an infrared port, such as, a television or DVD player.

USB

M600 is USB 2.0 (Universal Serial Bus) compliant. The bus is 12 Mbps and supports 63 devices. The idea of the USB is to allow easy connection of mobile phone to PC. USB is designed to be “completely Plug and Play”, meaning that devices will be correctly detected and configured automatically as soon as they are attached.

USB in a mobile phone means convenient data transfer between the phone and a PC.

M600 supports USB charging, you can charge your phone by plugging the USB lead into the PC, this is very useful if you travel a lot. The Memory stick™ is also visible on the PC as a mass storage device.

Data storage

M600 is divided into two parts:

- A GSM phone part, having flash memory. This is very similar to a conventional mobile phone.
- An 'Organizer' part running Symbian OS and having a large amount of flash and RAM memory plus a Memory Stick™ slot and the ability to exchange files with a PC.

The RAM (Random Access Memory) is controlled by the Symbian OS operating system and is not used to store any user or program data. The RAM is totally re-initialized when M600 is started.

The available 128 MB flash memory is split into 48 MB for operating purposes and up to 80 MB for storage of user data, such as, audio files, pictures, documents, additional languages and settings such as the active theme. Flash memory retains data even with no power applied. Unlike some PDA devices, M600 does not require a small 'memory backup' battery. Data stored on M600 is therefore not subject to loss due to such a battery running down.

The first 48 MB bank is used like a ROM. It stores the Symbian (UIQ) operating system, the built-in applications and some essential multimedia information like a default ringtone. It also stores the language files for UK English which is the default language of the Standard M600. Chinese models also have Chinese stored on the ROM.

Note: The extensive MMI of M600 means that it is impractical to hold many languages inside the phone, as is the case for some other models.

Part of the flash memory provides a 'C:' drive of up to 80 MB capacity. This behaves just like a normal disk drive. The folders can be viewed and managed from the File manager application or from a connected PC.

User storage

The user storage space (C: drive) is shared across applications without any imposed restrictions, apart from the whole space becoming full.

Unlike a PC, the user does not need to be aware of the underlying filing system. Applications will always store information automatically in the appropriate folder, simplifying the management of data. Third party applications may implement more complex file management solutions where required.

Additional storage space is available by using Memory Stick™. A 64 MB Memory Stick Micro™ M2™ is included with M600; and Memory Sticks of up to 4 GB capacity are supported. Any number of Memory Sticks may be used for storage. Memory Sticks may be used to exchange data with other devices. See “Memory Stick MicroTM M2TM” on page 41 for more information.

Depending on the application, data can be beamed, mailed, uploaded to the web, transferred to a PC or moved to a Memory Stick™ in order to archive and create free user space on M600. See “Synchronisation and data transfer” on page 48.

User storage configuration in the new M600

Applications and information are placed in the internal storage of M600 in the factory. This provides sample demonstration, educational, multimedia and fun content so that M600 can be used directly out of the box. Much of this can be deleted by the user in order to make the space available for personal use.

Action at master reset

Master Reset restores the phone to its purchase state, all user data is deleted. When a Master Reset is initiated the user can select to keep all user-installed applications. Data can be restored as follows:

If the user has previously backed up M600 using the Sony Ericsson PC Suite, then the C: drive can be restored to the condition it was in when the backup was made. The exception is DRM Forward Lock protected files which cannot be transferred to other media and therefore not backed up.

Otherwise, data can be re-loaded from the following locations:

- Try and Buy applications on the Memory Stick™.
- Sony Ericsson web site.

Since Multimedia content is easily transferable using Memory Stick™, infrared or Bluetooth™ wireless technology beaming, it is simple to restore favourite content from someone else's M600 (unless DRM protected).

Folder view of internal storage

This section explains in more detail how the data is organized on the C: drive.

When viewed from a PC using Sony Ericsson PC Suite, the 'C:' drive is named 'Phone Memory', but only a subset of the folders is accessible from the PC.

There is a folder for each media type: audio, video and image. Documents (such as Microsoft® Word files) are stored under the 'document' folder. An 'other' folder provides a place for files that do not fit into the other categories.

A folder is created beneath the applicable media type. There is no limit on the number of subfolders that can be created. Unfiled folders are created in the initial folder structure and all material is placed in the unfiled folder by default. Sony Ericsson Multimedia Content is stored in 'Sony Ericsson' subfolders.

Synchronisation and data transfer

To be truly mobile, users must be able to carry their important information with them. Equipping mobile phones with Personal Information Manager (PIM) programs like calendars, task lists and phonebooks gives users access to their most important data anywhere and anytime. The information is kept updated by synchronizing it with the information at the office or at home. The growing use of groupware such as Microsoft® Outlook® means that more and more meetings are booked electronically in daily business life.

M600 uses the SyncML 1.2 protocol for synchronization. This means that it has the compatibility to synchronize with a wide variety of devices over a number of different communications media.

SyncML – an open standard for synchronization

SyncML background

Leading the way in providing remote synchronization capability, Sony Ericsson realizes that interoperability of remote synchronization is of utmost importance if mobile data usage is to become as widespread as generally predicted. That is why Ericsson, along with IBM, Lotus, Motorola, Matsushita, Nokia, Palm Inc., Psion and Starfish Software, founded the SyncML initiative in February 2000. Supported by more than 600 software and hardware developers, the SyncML initiative seeks to develop and promote a globally open standard for remote synchronization, called SyncML. Unlike many other synchronization platforms, SyncML is an open industry specification that offers universal interoperability. Because it uses a common language, called XML, for specifying the messages that synchronize devices and applications, SyncML has been called the only truly future-proof platform for enabling reliable and immediate update of data. The benefit for the end user is that SyncML can be used almost anywhere and in a wide variety of devices, regardless of application or operating system.

M600 uses SyncML for both local synchronization (with a PC using Bluetooth™ connectivity or a cable connection) and remote synchronization over HTTP.

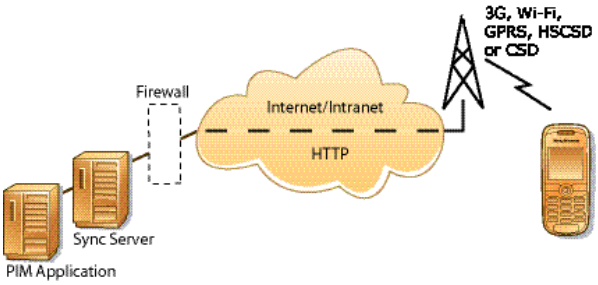
What information can be synchronized in the M600?

Application	Remote sync	Local sync
Contacts	✓	✓
Calendar	✓	✓
Tasks	✓	✓
Note (text part only)	**	✓
Email	**	✓
Bookmarks	**	✓

** Note, Email and Bookmark implementation are proprietary and therefore not SyncML compliant.

Remote synchronization

Remote synchronization takes place over the air using HTTP and is the ideal way to keep the M600 up to date. 3G enables a fast connection to the network - the synchronization can be started in seconds.



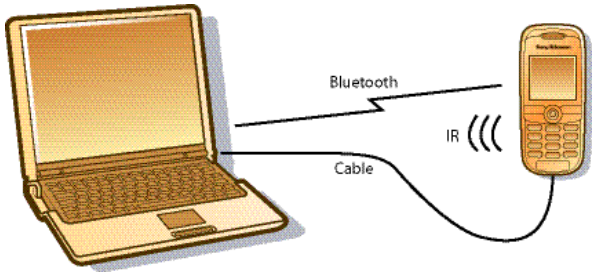
Synchronization services will be offered by third-party service providers and as added capability to corporate PIM applications. Corporate PIM applications such as Microsoft® Exchange can be supplemented with SyncML capability.

Server alerted synchronization

If updates are made on the PC the server automatically notifies M600. The updates are automatically synchronized to M600. A remote server can initiate a synchronization with the M600 using WAP Push.

Local synchronization

M600 is supplied with PC software for local synchronization. It may be loaded from the CD-ROM.



Bluetooth™ wireless technology, infrared or cable

M600 always synchronizes using SyncML, regardless of connection type. It connects via Bluetooth™ wireless technology, infrared or cable. The cable is connected directly to the phone or via the desktop charger connector.

Automatic synchronisation

Synchronisation can be configured to start automatically, given that a suitable synchronisation program must be running on the other device:

- When the USB cable is plugged in to M600.
- When Bluetooth is activated on both devices and they come into operating range.
- When infrared is activated on both devices and the infrared sensors are aligned.

Intelligent process

A synchronization engine performs the task of synchronizing. For local synchronization, the synchronization engine is an application that runs on the desktop computer. The synchronization engine compares, updates and resolves conflicts to ensure that the information in the phone is the same as that in the computer.

Compatibility

The PC software, supplied with the phone, enables synchronization with the following applications:

- Microsoft® Outlook® Express 4.0, 5.x.
- Microsoft® Exchange.
- Microsoft® Outlook® 2000, 2002, 2003.
- Microsoft® Internet Explorer 5.0 and 6.0 (for Bookmark synchronization).
- Lotus Notes® 5.0, 6.0, 6.5.

The PC requirements are as follows:

- 120Mb free space on hard disk.
- Microsoft® Windows® 2000 (SP4) or XP Professional or Home (SP2).
- Minimum recommended hardware configuration for the version of Windows in use.

File transfer utility

A utility is provided which enables files to be transferred to and from M600 connected to a PC. Typical uses for this include:

- Archiving pictures taken on M600 to PC storage.
- Moving images to M600 to use in personalization, MMS messages etc.
- Storing MP3 files on M600 or the Memory stick™.
- Moving sound clips to/from M600 for personalization.
- Store work documents (Word, Excel) on M600 to read on the move.

Backup and restore

Backup is initiated from the connected PC. Note that the USB cable must be used for backup. Infrared or Bluetooth wireless technology cannot be used for this purpose. Files in the user data area (which includes loaded third party applications) are backed up to PC storage.

The restore utility takes stored data from the PC and places it back on to M600.

Language change utility

M600 has a larger, richer UI compared to an ordinary mobile phone. Applications often have help information. Consequently, it is impractical to store languages on the phone. To facilitate a language change, a PC utility is provided which enables the required language to be loaded on M600. The Language Change Utility is not available for Chinese models.

Software installation utility

This utility enables M600 applications to be installed from the PC.

Internet wizard

This utility assists the user to create 3G, GPRS, HSCSD and CSD connection definitions for Internet and email use. All the necessary information can be entered in a logical way. Set infrared status to Modem in the Control Panel to use this facility over infrared.

Object exchange - 'send as'

M600 makes it easy to transfer objects over Bluetooth, infrared and Messages. This is presented to the user via 'Send as' commands in applications. Simply select an item such as a contact, select 'Send as' and select the method to be used for sending. Typical applications are to beam an appointment to other people, or to receive a new background image.

Bearer > Application (Data Type)	IR	Bluetooth	SMS	MMS	Email
Contact (vCard)	✓	✓	✓	✓	✓
Appointment (vCall)	✓	✓	✓	✓	✓
Tasks (vCall)	✓	✓	✓	✓	✓
Note**	✓	✓	✓	✓	✓
Image	✓	✓		✓	✓
Sound Clip (Ringtone)	✓	✓		✓	✓
Bookmark	✓	✓	✓	✓	✓
Sound recorder (Voice Notes)	✓	✓		✓	✓
Third Party Application (‘Send as’ API)	✓	✓		✓	✓

To perform a 'Send as' beam operation using infrared, the two devices are lined up and the sender initiates the transfer.

To beam over Bluetooth, a scan finds other devices within range. The user can then select the required device and send the information across.

When sending over SMS, MMS or email, the required message type is created with the selected object attached. It is then sent over the air.

Sony Ericsson PC suite

The Sony Ericsson PC Suite CD-ROM includes the following:

Local Synchronisation	PC software for synchronising PIM data between the phone and PC applications such as Microsoft® Outlook® and Lotus® Notes® and Lotus Organizer.
Backup and Restore	Utility to back up the data from the phone for storage on a PC. Restore enables data to be returned to the phone, such as after a software upgrade.
File Manager	Enables Windows Explorer to see the phone as a device and the internal and Memory Stick™ storage as two disk drives on the device. Multimedia files may be copied between the PC and the phone.
Software Installer	Utility to install new applications from the PC.
Language Change Utility	Enables the user to load a different language from the CD-ROM and switch the phone UI to that language, assuming the specific phone supports this. The language files are also available at www.SonyEricsson.com/support
Internet Wizard	Wizard for creating 3G, GPRS and HSCSD settings for Internet and email connections.
Drivers	Drivers for using the phone as a modem over infrared, Bluetooth or Cable.

DRM

Digital Rights Management, DRM, is a technology that enables secure distribution, promotion, and sale of digital media. Examples of such content include music, personal images, wallpapers and screen savers with themes from films, ringtones from musical artists, and branded games. In other words, content providers can control how users may use different types of content in devices, such as mobile phones, phones or PDAs. Content providers can also control the use of content in related services, such as MMS and download. Sony Ericsson is actively focusing on technology standardization for the DRM concept, and supports the ongoing standardization work and activities of the OMA (Open Mobile Alliance). Sony Ericsson is fully committed to open standard solutions in the mobile environment and is a principal driver of many open standard initiatives. This will ensure the interoperability of mobile terminals in the DRM area and also result in a strong, competitive DRM standard.

FWL – forward lock

M600 supports OMA DRM Forward Lock which is the simplest OMA DRM case, with no special access keys defined. The content is provided in a single DRM packaged file, thus protecting the content from being distributed from the device by the user. It enables a secure means for the content provider to deliver/provide content which incurs a charge. Forward Lock content will normally be received by M600 as part of an MMS message or via HTTP download. M600 supports OMA Download. More information is available at www.SonyEricsson.com/developer.

CD – combined delivery

M600 supports OMA DRM Combined Delivery/ Forward Lock. Content and associated access keys are downloaded or delivered to the user as a single DRM packaged file. This means the content, or access keys issuer, controls the extent the content can be used. As with pure Forward Lock, the user will be unable to distribute this content for use on another device.

SD – separate delivery

M600 supports OMA DRM Separate Delivery. Content and associated access keys are received as separate DRM packages, either simultaneously or at different points in time. This enables the distribution of content to other users and has the same possibilities to control usage of the content as exist with Combined Delivery/Forward Lock. Distribution of the content to other users will require the recipient to obtain access keys from the rights issuer in order to use the content.

Protection properties

Content that is protected according to the OMA DRM standard is given special properties.

Content with Forward Lock protection cannot be further distributed: The user cannot send the content to other devices since the “Send to” option is disabled for media protected with Forward Lock.

All three types of protected content packages can be transferred to the Memory Stick™, thereby enabling storage of large amounts of content.

OMA DRM Forward Lock/Combined Delivery protected content on a Memory Stick™ cannot be used in another device other than the device it was saved on. Only Separate Delivery packages can be used on another device, after obtaining access keys to use the content on the new device. Thus, the Memory Stick™ is one way of distributing Separate Delivery content to several users. Access keys to use the content can never be distributed from user to user (device to device). Access keys always have to be obtained directly from the rights issuer.

DRM package

DRM packaging software is typically included in the software used by the content provider. It is used to create the DRM package according to the OMA DRM V1 standards before it is delivered to the device, including content and associated access keys.

In Japan, only files with SD protection for playback will be accepted in the Media player and in some European markets only DRM content can be used for automated use/themes such as ringtones.

Personalization

The M600 can be personalised by the user in one of the following ways:

- Update the User Interface using services, such as, M-Service.
- Use PC-based utility application.
- Via Over the Air (OTA) configuration, initiate by the operator, user or IT helpdesk.

Alterations to the appearance of many of the screens may be simply carried out through changing the phone's Theme. New Themes may be loaded on to the M600 from the Internet and other sources.

Background and application shortcuts

User can set a static image, or animated GIF, to be the background 'wallpaper' for the standby screen. Image size is 208 x 189 pixels and formats JPEG, GIF, BMP, WBMP, MBM and PNG are supported. Larger images, will be resized to fit.

The application shortcut buttons may be personalized by the user. The user may also select to have them displayed all the time.

Screen Saver

A 'screen saver' image is displayed after a period of inactivity. The user can switch this facility on and off and select the delay period before the screen saver is displayed. Image size is 208 by 320 and the format is the same as the background image above. Note that use of animated GIF increases power consumption.

Device lock may be used in combination with the screen saver. Upon pressing a button or touching the screen, the user will be prompted to activate keys and/or enter the device lock code.

When the screen saver is deactivated, the M600 will revert to the state it was in before the screen saver was activated.

Picture phone book

The user may store a picture of each contact in the Contacts application. When an incoming call is received with CLI matching that contact, the contact's picture will be displayed together with the other information. The contact's picture is also displayed when making a call, or using the speed dial screen in picture view mode. A copy of the picture is held in the Contacts database; therefore, the original picture may be deleted or renamed without losing the copy stored in Contacts.

Ringtones

The user can add as many ringtones as desired, subject only to available file space. Ringtones may be collected from many sources including Memory Stick™, MMS, EMS and transfer from a PC.

Any compatible audio file in the multimedia storage (Internal or Memory Stick™) including MP3 can be selected as a ringtone. The M600 can play both iMelody format ringtones and the following polyphonic formats: AMR, AU, MIDI, RMF (Beatnik), MP3 and WAV.

A system default ringtone is provided. This is the ringtone when the M600 is first initialised. It cannot be deleted and is retained after a Master Reset.

A Personal ringtone may be selected for a contact - simply select the required ringtone while entering or editing the contact's details. When the Calling Line Identification (CLI) of the incoming call is matched to a contact, the Personal ringtone for that contact will be played. If the ringtone has been deleted, moved, renamed or exists on a Memory Stick™ that is unplugged, then the system default ringtone will be played.

If no CLI information is available, then only a default ringtone can be played. If the user has selected a personalized default ringtone and it is available (can be read from the internal storage or Memory Stick™) then it will be played, otherwise the system default will be played.

Themes and skins

A Theme or skin is a way to provide a complete customized visual experience for the user.

Themes can define:

- Text, outline and background colours.
- Background images.
- Graphical appearance of interface elements.
- Sounds for events, for example, ring signals, message alerts, notification, area info, auto set-up and reminder.

Themes and skins can be created or downloaded.

Over-The-Air (OTA) Configuration

OTA remote configuration provides simple set-up of services. The user is spared the task of finding complex technical information and then manually entering it via the UI. Instead, a web request or a call to be the mobile operator's helpdesk is all that is necessary - the appropriate settings can then be sent via SMS directly to the M600.

OTA configuration using the Ericsson/Nokia Over The Air Settings Specification enables the following parameters to be provisioned:

- WAP Account (Account name and WAP Gate-way settings).
- ISP Settings (Bearer information, username, password).
- Bookmark (name and URL).
- SyncML DS settings.
- MMS Settings.

The following parameters may be remotely configured according to WAP Forum specifications:

- WAP Account
- ISP Settings

Further OTA configuration is provided using Nokia Smart Messaging. It is used to set up email accounts, specifically:

- ISP (Bearer information, username, password, IP and DNS addresses, login script)
- Email account (Username, password, address, server details)

Sony Ericsson phone configurator

Sony Ericsson's phone configurator provides settings for many networks as a free service to owners of Sony Ericsson mobile phones. It can be found at www.SonyEricsson.com.

Locks

M600 has the following lock functionality:

Keylock

The Keylock can be turned on or off by:

- A long press on the back key.
- The standard keypad sequence (# then unlock).
- The status bar battery icon dialog.

Locking the keypad can invoke the 'power save now' option or the screen saver (user setting).

Auto keylock is a user setting, only activated from standby.

Phone lock

The phone lock can be set to ‘off’, ‘at power on’ or ‘when SIM changed’.

When set to ‘at power on’ the phone lock code has to be entered every time the phone is turned on.

When set to ‘when changing SIM’ the phone lock will be activated if the SIM is changed, this prevents other users from using the phone with their SIM without the owner’s consent.

The code can be changed by the user as long as they know the current code.

SIM card lock

The SIM card lock can be set to ‘off’ or ‘at power on’.

If the SIM card lock is set to ‘off’ the SIM can be used by any user without the SIM owner’s consent.

If the SIM card lock is set to ‘at power on’, everytime the M600 is switched on the user will have to enter a predefined code. The code can be changed by the user as long as they know the current code.

3G

Increased 3G data rates, together with extended multimedia and entertainment content, has enhance the use of mobile Internet in a revolutionary way.

The 3G (third-generation) service combines high speed radio access with IP (Internet Protocol)-based services.

The connectionless nature of IP makes access a lot faster: file downloads take less time and we can be connected to a network within a few seconds.

3G has significantly boosted network capacity allowing operators to support more users, and offer more sophisticated services.This phone is dual mode, meaning the user will be able to use M600 without having to think about which system is in operation – the handover between the two systems is seamless.

GSM and WCDMA development

Wideband technology is deployed in parallel with the enhancement of the existing spectrum, re-using parts of the GSM infrastructure. All spectrum assets are valuable, as there is a substantial

increase in both the number of subscribers and the volume of traffic in the networks. This seamless solution gives operators a flexible network where the systems interact according to current demand.

User experience

For the consumers, using a network consisting of GSM, GPRS and WCDMA parts is a seamless experience. GPRS allows qualified mobile Internet applications, while the introduction of WCDMA brings a whole new set of user services, using the full potential of wideband data transport

Handover/service continuity

The scope of this text includes service requirements for handover maintaining continuity of service to a wireless terminal, as it moves between the radio coverage area, or “cells”, associated with different base station sites. This functionality is called “handover”. It is a key requirement to allow for dual or multi-mode terminals to handover traffic from UTRAN to other radio systems such as GERAN and vice versa. This part describes the general principles for service continuity within UMTS Radio Access Network, within GSM/GPRS and between UMTS Radio Access Network and other radio systems such as GSM/GPRS. As a principle, the requirements on service continuity characteristics should be according to the target network on which the service is maintained.

Service continuity

Service continuity should support the following scenarios:

- Continuity of active circuit switched services when moving within UMTS Radio Access Network, within GSM/GPRS and between UMTS Radio Access Network and GSM/GPRS coverage areas.
- Continuity of active and packet switched sessions when moving within UMTS Radio Access Network, within GSM/GPRS and between UMTS Radio Access Network and GSM/GPRS coverage areas.

General operational considerations

Mechanisms defined to support service continuity between different radio systems or radio access modes should effectively cope with a number of coverage scenarios:

- Limited coverage in a “sea” of coverage provided by another radio system or radio access mode.
- Selective operation at a geographical boundary, with extensive UMTS Radio Access Network coverage on one side, and extensive coverage from another radio system on the other side.
- Geographically colocated areas of UMTS Radio Access Network coverage and another radio system.

Performance requirements

Temporary degradation of service caused by handover

During intra-UMTS Radio Access Network handover or handover from UMTS Radio Access Network to GSM/GPRS, degradation of service should be no greater than during intra-GSM/GPRS handover. The duration of the discontinuity experienced by packet switched and circuit switched real time services should be shorter than that in the handover of voice calls over GSM/GPRS.

Requirements on multiple bearer services handover from UMTS radio access network to GSM/GPRS

Consideration must be given to services that may involve multiple bearer services (and simultaneous sessions). The mapping between UMTS Radio Access Network bearer services and GSM/GPRS bearer services depends on many factors such as data rate, delay constraints, error rate etc. In the event that certain UMTS Radio Access Network bearer services cannot be handed over to GSM/GPRS, the handover of some of the bearers to maintain the service should not be precluded.

In the case where a user equipped with a dual mode terminal is in UMTS Radio Access Network coverage, and has multiple PDP contexts activated (for instance to support multimedia), then it is preferable to handover one PDP context, rather than dropping all of them.

As a first priority only the PDP contexts which have an associated QoS that can be supported by the GSM/GPRS should be candidates for handover.

If there are still multiple PDP contexts as “handover candidates”, then the operator should choose which PDP is maintained. When roaming, the serving network should make this decision. The operator may choose to either:

- Drop all of the PDP contexts.
- Choose one based upon criteria such as duration, amount of traffic transferred, etc.

Handover in M600

This phone is compliant with the 3GPP R99 December 2002 release.

GSM to UMTS

The product supports circuit switched voice handover from GSM to UMTS.

UMTS to GSM/GPRS

The product supports packet switched data handover and circuit switched voice handover from UMTS to GSM/GPRS.

Positioning

The basic cost efficient positioning method available in 3G networks relies on measuring round-trip time. In 3G it is called Cell-ID + TA (Timing in Advance).

Time difference measurement, involving several base stations, can be used to obtain a more accurate position.

Positioning methods are already used to support location-based information services such as ©YellowPages, restaurant guides, traffic information, directions and friend finder applications. Typically SMS or voice has been used as delivery mechanisms. Java™ and MMS will add new possibilities to deliver attractive location-based applications.

GPRS

The introduction of GPRS was a big step in the evolution of the GSM networks for enhancing the capabilities of data communication. Data traffic has increased (over both wired and wireless networks), with the growth in demand for Internet access and services paralleling that of mobile communications.

We can now see that the demand for high-speed Internet access is the key driver for coming generations of wireless multimedia and entertainment services, and GPRS is important as a stepping stone when we enter the 3G network era. GPRS has allowed innovative services to be created and granted access to new and previously inaccessible market segments, which will be further developed with 3G.

GPRS is able to take advantage of the global coverage of existing GSM networks. Applications developed for GPRS have been deployed on a large scale and have thus reaped the associated benefits.

With GPRS, M600 sends data in “packets” at a very high speed. The phone remains connected to the network at all times, using transmission capacity only when data is sent or received. Instead of occupying an entire voice channel for

the duration of a data session, M600 sends and receives data in small packets, as needed, much like IP on the Internet. Thanks to this, the phone is always online, using transmission capacity only when data is sent or received. M600 is compatible with GPRS R99.The GSM system limits the ability to use all eight time slots, so M600 uses up to four time slots for receiving data, and up to one slot for transmitting.

Information about the identity of the phone and the characteristics of the connection are described in the PDP (Packet Data Protocol) context. This information is stored both in the phone and in the mobile network, so that each phone is identified and “visible” to the system.

Using GPRS with M600 has many advantages:

- Constant connection
  Keep an open connection to an email system or the company network, staying online to receive and send messages at all times. All connection settings can be managed by using the data connections feature.
- High speed
  Gain access automatically to increased bandwidth when downloading large files, images etc.
- Cost efficient
  Use transmission capacity only when needed, thus reducing costs.
- Email over GPRS
  Remain connected to an email system while reading and preparing messages, (which are then sent at high speed).

Symbian OS operating system

Symbian OS is the open operating system licensed by the world's leading mobile phone manufacturers. It is designed for the specific requirements of advanced 2G, 2.5G and 3G mobile phones. Symbian OS combines the power of an integrated applications environment with mobile telephony, bringing advanced data services to the mass market.

Symbian OS supports a wide range of device categories with several user interfaces, this includes UIQ, which is the software platform used by M600.

Key features of symbian OS v9.1:

General:

- Improved system performance, especially at start up.
- New multimedia framework supporting recording, playback and streaming.
- Direct access to screen and keyboard gives high performance; graphics accelerator API; and increased UI flexibility (support for multiple simultaneous display, multiple display sizes and multiple display orientation).
- Java™ support for the latest wireless Java standards. See “Java™” on page 61 for more details.
- Communications protocols using; wide area networking stacks including TCP/IP (dual mode IPv4/v6) and IPSec. Improved personal area networking support including infrared (IrDA), Bluetooth™ connectivity and the introduction of USB. Support is also provided for multihoming and link layer Quality-of-Service (QoS) on GPRS and UMTS networks.
- Symbian OS v9.1 is ready for the 3G market with support for: WCDMA (3GPP R4); GSM circuit switched voice and data (CSD); packet-based data (GPRS); SIM; and U-SIM.
- Supports the Unicode Standard version 3.0.

- Data synchronization has been improved to cover the following: over-the-air (OTA) synchronization support using OMA standards (OMADS 1.2); PC-based synchronization over, Bluetooth connectivity, infrared and USB; a PC Connectivity suite providing the ability to transfer files and synchronize PIM data.
- Improved device management which provides network operators and enterprises with new capabilities to manage phones in the field. This includes OMA DM 1.1.2 support and OMA client provisioning 1.1.
- Support for Bluetooth wireless technology eSCO and Bluetooth stereo headset profiles have been implemented.

Security:

The aims of the security developments in Symbian OS v9.1 are to protect the integrity of the phone, provide extra control over user billable events and to prevent malicious software corrupting executables and data. The aims have been met by:

- Providing platform security by a proactive system defence mechanism based on granting and monitoring application capabilities through Symbian Signed certification. The infrastructure allows applications to have private protected data stores.
- A proactive defence mechanism against malware. The platform security infrastructure uses a capability based model which ensures that sensitive operations, such as, modifying user data, making calls and using network connections, can only be accessed by applications which have been certified by an appropriate signing authority.
- Data caging; this allows applications to have their own private data protection. This allows applications a guaranteed secure data source. This can be used for applications, such as, ecommerce. An application can access other directories marked as open but cannot access another application's private directory.
- Additional platform security includes; full encryption and certificate management, secure protocols (HTTPS, SSL and TLS) and WIM framework.

EKA2 Kernel:

- A new realtime kernel (EKA2) with guaranteed response times provides the basis for a robust and power-efficient phone. Predictable real time operation means that the OS will respond to interrupts, system and user threads within a known period. This means that no task in the system can prevent the OS from responding to key tasks.
- Support for multiple simultaneous IP connections.

Development and testing:

- Provides new customization and configurability options for the operating system.
- Symbian OS is built using the ARM RVCT 2.1 compiler. This compiler is compliant with the ARM EABI standard. This allows compatibility with the latest ARM compilers and reduces the Symbian OS footprint while enchancing performance.
- Developing for Symbian OS - native system and application development in C++, supported by CodeWarrior and shortly Eclipse-based IDEs (. Java MIDP 2 supported by all mainstream Java tools. PC-hosted emulator for general development.

UIQ 3.0

The new UIQ 3.0 platform offers support for multiple form factors on the same code base and ease of operator configuration.

UIQ 3.0 is based on Symbian OS v9.1 and is equipped to meet the various demands from phone manufacturers, network operators and end users.

- Customization of software is important. UIQ 3.0 offers new features for operator customizations and branding. Sony Ericsson will use these features to configure M600 to meet requirements from network operators. The same customizations can then be re-used on other UIQ phones with different form factors.

- Developers can utilize the new features of UIQ 3.0 to easily develop applications.
- The SDK (Software Developers Kit) can be used to expand these applications or create new ones. Building blocks, layout managers and a wide range of controls, such as menus and dialogs, make it easier to design applications for UIQ. Using these tools also gives the applications the UIQ look and feel which users are familiar with. The application framework and system services are the basis of the UI platform.

Java™

M600 supports two kinds of Java™ ME CLDC 1.1 and CDC 1.0:

CLDC 1.1 JARs supported:

- JTWI 1.0 (JSR-185) consisting of CLDC (Connected Limited Device Configuration) 1.1 HI (JSR-139), MIDP 2.0 (JSR-118), WMA 1.1 (JSR-120).
- PDA PIM and File Access (JSR-75).
- Bluetooth™ wireless technology (JSR-82).
- Wireless Messaging API 2.0 (JSR-205).
- Web Service (JSR-172).
- Mobile Media API (JSR-135).
- Mobile 3D Graphics (JSR-184).
- Nokia UI API 1.1.

CDC 1.0 JARs supported:

- Foundation profile 1.0 (JSR-46).
- Personal profile 1.0 (JSR-62).
- PDA File Access (JSR-75).

M600 consumer package

The exact contents of the M600 package depend on the localization.

The basic contents are as follows:

- M600 with stylus.
- Battery.
- Travel charger.
- USB cable.
- Stereo headset.
- Memory Stick Micro™ M2™.
- User documentation package.
- Sony Ericsson PC Suite CD.

Accessories

Accessories	Product name
Batteries	
Standard Battery	BST-33
Chargers/Desk Stands	
Micro Travel Charger	CMT-60
Desk Stand	CDS-60
Charger	CST-60
Car	
Cigarette lighter adapter	CLA-60
Bluetooth™ Car Handsfree	HCA-60 and HCB-300
Dedicated Car Holder for M600	HCH-67
Universal Car Holder	HCH-60
Handsfree	
Portable Handsfree	HPB-60 and HPE-60
Sport Portable Handsfree	HPS-60
Bluetooth™ Handsfree	HBH-200
Akono™ Headset	HBH-300
Akono™ Headset	HBH-600
Akono™ Headset	HBH-602
Akono™ Headset	HBH-605
Akono™ Headset	HBH-608
Akono™ Headset	HBH-610
Akono™ Headset	HBH-620
Akono™ Headset	HBH-660
Akono™ Headset	HBH-662
Akono™ Headset	HBH-670
Entertainment	
Stereo Portable Handsfree kit	HPM-61
Ultra Style Stereo Portable Handsfree	HPM-70
Connectivity	

USB Cable	DCU-60
Imageware	
Executive Case	IEC-20
Stylus Pack	ISP-XX
Concepts	
Quick Install BT Car Kit	HCB-300

Technical specifications

General technical data

Product name	M600
System	Tri-band GSM Release 99 recommendations. GSM 900 (CTR 19 and CTR 20) GSM 1800 (CTR 31 and CTR 32) EGSM and WCDMA FDD mode supported Latin America 1800, 1900 and e-GSM mode supported.
Speech coding	HR, FR, EFR, AMR supported where available, for high speech quality.
Operating system	Symbian OS v9.1 UIQ 3.0
Processor	ARM
GSM SIM/ UMTS USIM card	GSM SIM - GSM 11.11, UMTS USIM - 3GPP™ TS 31.102. Small plug-in card, 1,8 V and 3 V.
Internal memory size	For settings, User data (such as, images, contacts, messaging) and third party applications: Up to 128 MB external.
Additional storage	Memory Stick Micro™ M2™, up to 4 GB size supported. 64 MB Memory Stick Micro™ M2™ supplied.
Data transfer speeds	High speed 12 Mbps
Length	105 mm
Width	54 mm
Thickness	15 mm
Weight	112 g
Antenna	Built-in

Colours	Granite Black and Chrystal White
Battery	900 mAh

Screen

Display type	TFT
Display size	QVGA
Pixel size	240 x 320
Colour resolution	262 k
Screen surface	Touch-sensitive
Illumination	Variable intensity backlight

Performance and technical characteristics

Dimension	**GSM 900/ E-GSM 900**	**GSM 1800**	**GSM 1900**	**WCDMA**
Frequency range (MHz)	TX: 880 – 915 RX: 925 – 960	TX: 1710 – 1785 RX: 1805 – 1880	TX: 1850 – 1910 RX: 1930 – 1990	TX:1920 – 1980 RX:2110 – 2170
Channel spacing	200 kHz	200 kHz	200 kHz	5 MHz with 200 kHz channel rasters
Number of channels	174 Carriers *8 (TDMA)	374 Carriers *8 (TDMA)	299 Carriers *8 (TDMA)	277
Modulation	GMSK	GMSK	GMSK	QPSK
TX Phase Accuracy	< 5º RMS Phase error (burst)	< 5º RMS Phase error (burst)	< 5º RMS Phase error (burst)	Error Vector Magnitude: <17.5%
Duplex spacing	45 MHz	95 MHz	80 MHz	190 MHz
Frequency stability	+/- 0.1 ppm	+/- 0.1 ppm	+/- 0.1 ppm	+/- 0.1 ppm
Voltage operation (nominal)	3.6 V	3.6 V	3.6 V	3.6 V
Transmitter RF power output	33 dBm Class 4 (2 W peak)	30 dBm Class 1 (1 W peak)	30 dBm Class 1 (1 W peak)	24dBm Class 3 (0.25 W peak)
Transmitter Output impedance	50 Ω	50 Ω	50 Ω	50 Ω

Dimension	GSM 900/ E-GSM 900	GSM 1800	GSM 1900	WCDMA
Transmitter Spurious emission	< -36 dBm up to 1 GHz < -30 dBm over 1 GHz (according to GSM spec)	< - 30 dBm (according to GSM spec.)	< - 30 dBm (according to GSM spec.)	< -36 dBm up to 1 GHz < -30 dBm over 1 GHz (according to 3GPP™ spec)
Receiver RF level	Better than – 102 dBm	– 102 dBm	Better than – 102 dBm	Better than -106.7 dBm @ 12.2 kbps CS voice
Receiver RX Bit error rate	< 2.4%	< 2.4%	< 2.4%	< 0.1%

Current consumption, talk and standby times

Talk time	GSM up to 7.5 hours UMTS up to 2.5 hours
Operating time	Up to 8 hours read and edit emails with back light on (GSM and UMTS) TBD
Standby time	GSM up to 340 hours UMTS up to 250 hours

USSD technical data

Feature	Support
USSD support	GSM Phase 1/2 (Cross-phase compatibility). GPRS behaviour according to class B.
Mode support -mode	UI-mode supported. SAT initiated USSD supported.
UI-mode details	• It is possible to scroll the text up and down in USSD messages. • It is possible to highlight embedded numbers and take actions accordingly.

GPRS technical data

Dimension	Support
Compatible GPRS and SMG specifications	Release 99 according to ETSI specification.
Data rates	Multislot class 10 supported (4+2) CS-1, CS-2, CS-3, CS-4 9,050 bps, 13,400 bps, 15,600 bps, 21,400 bps supported (network-dependent).
Medium Access Modes	Dynamic allocation
Support of Packet Control Channels (PBCCH/PCCCH)	Yes
Network operation mode	NOM I, II, III
Support of GPRS/CS combined procedures	Yes
Network control mode	NC0 and 2
Support of access in 2 phases	Yes
Support of PRACH on 11 bits	Yes
Support of GPRS re-selection C31/ C32	Yes
Support of static and dynamic addressing	Yes
Support of power control Uplink and Downlink	Uplink = yes, Downlink is a network feature.
Support of ciphering algorithms	GEA1, GEA2
Support of compression algorithms	Yes, V42bis and IP header compression.
Mode of operation	Class B and Class C modes of operation supported.
R Reference point	Physical layer: Support of RS232 PPP is supported as L2 layer in the R reference point Authentication algorithms PAP, CHAP supported
IP connectivity	PDP type IP is supported IP termination in mobile or TE (laptop, PDA) supported
PDP context	10 PDP context descriptions stored in mobile PDP context description is edited via application in mobile, AT-command or via OTA Simultaneous PDP contexts are supported, maximum 2.

Dimension	Support	
SIM	GPRS aware, as well as non-GPRS aware; SIM cards are supported.	
AT commands supported	AT+CGDCONT - DEFINE PDP CONTEXT AT+CGQREQ - Quality of Service Profile (REQUESTED) AT+CGQMIN - Quality of Service Profile (Minimum Acceptable) AT+CGATT - PACKET DOMAIN SERVICE ATTACH OR DETACH	AT+CGACT - PDP CONTEXT ACTIVATE OR DEACTIVATE AT+CGDATA - ENT

GPRS maximum data rates (Kpbs)

		CS-1 9.05 Kbps	CS-2 13.5 Kbps	CS-3 15.6 Kbps	CS-4 21.4 Kbps
4 + 1	Rx	36.2	53.6	62.4	85.6
	Tx	9.05	13.4	15.6	21.4

HSCSD maximum Data Rates (Kpbs)

		9.6 Kbps per timeslot	14.4 Kbps per timeslot
2 + 1	Rx	19.2	28.8
	Tx	9.6	14.4

Keypad

- 26 keyswitches.
- Jog Dial, 3-way: up, down and inwards.
- Browser button to switch to integrated browser.
- On/Off button.
- Back button to switch back a view.

Input

M600	Dual function keyboard natural handwriting over the whole screen on-screen keyboard Zi-Corp eZiText word completion fuzzy text Next word completion

Third party application support

EMO Sony Ericssons' generic push email application	Supplied on the Memory Stick Micro™ M2™. Try and buy.
McAfee, AntiVirus software	Supplied on the Memory Stick Micro™ M2™. Three months free subscription.
Pointsec, File Encryption	Supplied on the Memory Stick Micro™ M2™. Try and buy.
McAfee, Firewall	Supplied on the Memory Stick Micro™ M2™. Try and buy.
Wayfinder, Euroguide	Supplied on the Memory Stick Micro™ M2™. Try and buy.
VoiceSignal	Supplied on the Memory Stick Micro™ M2™. Try and buy.
Mobimate, Worldmate Professional	Supplied on the Memory Stick Micro™ M2™. Try and buy.
Mobipocket, eBook Reader	Supplied on the Memory Stick Micro™ M2™. Try and buy.
Shape Services, IM+ (MSN, AOL)	Supplied on the Memory Stick Micro™ M2™. Try and buy.
EPOCware, Handy Expense	Supplied on the Memory Stick Micro™ M2™. Try and buy.
EPOCware, Handy Safe	Supplied on the Memory Stick Micro™ M2™. Try and buy.
Karrier Com, Intelligolf	Supplied on the Memory Stick Micro™ M2™. Try and buy.
SmobileSystems, SMS Guard	Supplied on the Memory Stick Micro™ M2™. Try and buy.
EPOCware, Handy Day 2006	Supplied on the Memory Stick Micro™ M2™. Try and buy.

EPOCware, SlovoEd	Supplied on the Memory Stick Micro™ M2™. Try and buy.
ZingMagic, Chess Professional	Supplied on the Memory Stick Micro™ M2™. Try and buy.
ZingMagic, Zingles	Supplied on the Memory Stick Micro™ M2™. Try and buy.
Webgate, Advanced Call Manager	Supplied on the Memory Stick Micro™ M2™. Try and buy.
Appello, WisePilot	Supplied on the Memory Stick Micro™ M2™. Try and buy.
Audible	Supplied on the Memory Stick Micro™ M2™. Try and buy.
Speereo Software, Voice Translator Multilanguage 2.0	Supplied on the Memory Stick Micro™ M2™. Try and buy.
Rock-Your-Mobile, Abaskus	TBA
Extended Systems, OneBridge	TBA
Consilient, Push IMAP	TBA
Telmap	TBA
Route 66	TBA
Pointer Solutions, Tracker My Way	TBA
Tom Tom	TBA
Good, Goodlink	TBA

Media player

File Format	Video: MP4 (MPEG4 and AAC-LC), 3GP (H.263 AMR NB/WB and AAC) and Real Audio Video Audio: AU, iMelody, AAC, AMR, MP3, RMF, DLS, Real Audio, G-MIDI level 1 with 72 voices polyphony, WAV (up to 16 KHz sample-rate), XMF
Streaming transport	RTSP according to 3GPP™
Video decoding	MPEG-4 Simple Visual Profile Level 0 H.263 Profile 0 Level 10 H.263 Profile 3 Level 10
Audio decoding	AAC-LC, AMR-NB, AU, iMelody, Midi, SP-Midi, MPEG layer 3, RMF, WAV, XMF, DLS, Real Audio 9, eACC+ and ACC+.
Features	Automatic loop of songs in folder. Automatic pause on telephone call.

Pictures

Formats	JPEG, BMP, GIF (including animated), PNG, MBM, WBMP, SVG-tiny
Sharing via	IR, Bluetooth™ wireless technology, MMS, Email, PC file transfer, Memory Stick Micro™ M2™, USB

Image decoders

Decoder	Details	Size	Colour depth	File format
GIF	87a/89a			
JPEG	ISO/IEC JPEG • Baseline DCT • Progressive DCT • Non-differential • Huffman coding • Symbol 'SOF2'	Megapixel		• JFIF v1.02 • EXIF
BMP	The bitmap image format used by Windows®.	XRAM dependent, default is VGA.	18-bit	
WBMP				
PNG				

Image encoders

Decoder	Details	Size	Colour depth	File format
GIF	89a			
JPEG	ISO/IEC JPEG • Baseline DCT • Non-differential • Huffman coding • Symbol 'SOF0'	Megapixel		JFIF v1.02
BMP	The bitmap image format used by Windows®.	XRAM dependent. Default is VGA.	18-bit	
WBMP				

Short message service

Feature	Support in M600
SMS Centre Number	It is possible to pre-record the SMS Centre Number.
Pictures	It is possible to insert a picture or an icon into the text message. EMS compliant mobile handsets will be able to see the picture correctly.
Input methods	Dual function keyboard, on-screen keyboard, touch screen, predictive text input and multitap.
Reply to messages	It is possible to reply to received messages by MMS, SMS or phone call.
Copy, cut and paste words	Yes
Teaching of predictive words that are not in the predictive dictionary	Yes
Possibilities when creating a message:	
save a sent message in a “sent items” folder	Yes
insert a line in the message	Yes
assign a validity period to the message	Yes
print via IrDA	No
use pre-defined messages	No
Possibilities when receiving a message:	
reply to the sender	Yes
forward the message	Yes
save the message on SIM	No
get delivery time and date	Yes, but not via messaging
print via IrDA	No
Possibilities of the previously sent message:	
delivery report of the message	Yes
forward the message	Yes
save the message on SIM	Yes
know the remaining capacity storage	Yes
print via IrDA	No
Possibilities of the previously received message:	
reply to the sender	Yes

Feature	Support in M600
save the message in the Inbox	Yes
forward the message	Yes
know the remaining capacity storage	Yes
Supported ways for replying to a received SMS:	
via SMS	Yes
via phone call (set up a call to the number contained in the message body)	Yes
via USSD session	No
Possibility to offer the user the ability of sending an SMS to a list of recipients	Yes, using phonebook groups or entering multiple numbers manually.
Possibility to write an email address as a recipient address	No
SMS storage	In handset and SIM.
Nokia Picture Messaging	No

Enhanced message service

Feature	Support in the M600
Level of compliance supported by the handset regarding the specifications described in release 99.	Enhanced Messaging Service (EMS) according to the standard 3GPP™ TS 23.040 v4.3.0, with the addition of the ODI feature from 3GPP™ TS 23.040 v5.0.0.
Number of messages that the handset is able to handle to generate a concatenated message	TBD
Capacity storage	TBD
Outgoing messages	It is possible to: • see how many short messages an EMS message consists of before sending it. • choose whether to send the message or not after writing it.
Incoming messages	• A signal is heard once all parts of the message have been received. • It is possible to re-use the content of an EMS message. Sounds, pictures, and animations can be inserted in a new message, if the object is not protected using ODI.
Concatenated messages	A receipt is received in the handset when all parts of a concatenated message have been delivered.

Feature	Support in the M600
Insert objects	It is possible to add pictures, animations and sounds to an EMS message.
Text formatting	• Centred, left and right aligned text. • Small, normal and large font size. • Bold, italic, underlined and strikethrough style.
Sounds	Chimes high, chimes low, ding, tada, notify, drum, claps, fanfare, chords high, chords low.
I-melody	Yes, version 1.2.
Melodies	It is possible to: • send and receive melodies via EMS, if the melodies are not protected by copyright. • download melodies and commercial tunes. • create melodies.
WBMP	Yes
Picture sizes	16 x 16 mm, 32 x 32 mm, variable size in black and white.
Pictures	It is possible to: • edit pictures. • send and receive pictures via EMS, if the pictures are not protected by copyright. • create pictures. • download pictures. • receive pictures in enhanced messages originated by service providers.
Animations	The handset supports the following animations: I am ironic, I am glad, I am sceptic, I am sad, WOW!, I am crying. Plus the other nine animations defined in 23.040 v4.3.0. It is possible to send and receive animations.
TP-PID field value given by the handset before sending an EMS message	0x00

Multimedia message service

Feature	Support in the M600
Support of MMS protocol stack version	1.2
MMS/circuit switched parameters and MMS/ packet switched parameters placement	MMS is bound to a Data Account. A Data Account contains either circuit switched parameters or packet switched parameters.
Possibility to pre-configure the MMS parameters in factory	• MMS circuit switched: Yes • MMS packet switched: Yes

Feature	Support in the M600
Possibility to configure the MMS parameters by OTA provisioning	• MMS circuit switched: Yes • MMS packet switched: Yes
Possibility for all the parameters from the parameters set to be OTA provisioned at the same time	• MMS circuit switched: Yes • MMS packet switched: Yes
Possibility for only one parameter from the parameters set to be OTA provisioned	Using Device Management: • MMS circuit switched: Yes • MMS packet switched: Yes Using Client Provisioning: • MMS circuit switched: No • MMS packet switched: No
OTA provisioning solution	OMA Device Management and OMA Client Provisioning supported
MMS User Agent functional entity will be a separate entity from Web browser:	Yes
MMS User Agent support	OMA UAProf.
Supplier indication of realized interoperability tests between its MMS User Agent and MMS Relay/Server from other suppliers	Yes
Support of a standard or a proprietary procedure for OTA provisioning of MMS parameters	OMA Device Management and OMA Client Provisioning
Functionalities that the user is able to set during message composition:	• message *subject* • MSISDN recipient address • *email* recipient address • message *Cc* recipient(s) address(es) • *delivery report* request • *read-reply* report request • *message* priority • *validity* period
From where can the user insert multimedia elements into multimedia messages:	• terminal memory • directly from camera
Supplier indication if MMS User Agent will be able to handle a network-based address book	No
Possibility for sent messages to be memorized into a folder in handset memory	Yes
Actions that the user can perform after message notification:	• retrieve the message immediately • defer message retrieval • reject message

Feature	Support in the M600
Actions that the user can perform after message retrieval:	• reply to the sender of the message • reply to the sender and to Cc people • forward the message • delete the message • save message into terminal
Multimedia codecs/formats supported for audio	AMR, MP3, AAC, WAV Depending on content class/creation mode settings, the following formats are also supported: AAC-LC AMR-NB AMR-WB SP-MIDI XMF DLS Real Audio
Multimedia codecs/formats supported for video	MP4, H263 Depending on content class/creation mode settings, the following format is also supported: Real Video
Multimedia codecs/formats supported for image	Baseline JPEG, wbmp, SVG, GIF 89a
MMS User Agent provides:	• text formatting facilities (only text size) • coloured text/background (Viewer/player supports coloured text and background.) • Dual function keyboard, on-screen keyboard, touch screen and predictive text input.
Support of MMS protocol stack version	1.2
MMS/circuit switched parameters and MMS/packet switched parameters placement	MMS is bound to a Data Account. A Data Account contains either circuit switched parameters or packet switched parameters.
Possibility to pre-configure the MMS parameters in factory	• MMS circuit switched: Yes • MMS packet switched: Yes
Possibility to configure the MMS parameters by OTA provisioning	• MMS circuit switched: Yes • MMS packet switched: Yes

SIM AT services supported

Service		Mode	Support
CALL CONTROL BY SIM			Yes
DATA DOWNLOAD TO SIM		Cell Broadcast SMS	Yes Yes
DISPLAY TEXT		Text of up to 240 characters (120 UCS2 coded).	Yes
	bit 1:	0 = normal priority	Yes
		1 = high priority	Yes
	bit 8:	0 = clear message after a delay	Yes
		1 = wait for user to clear message	Yes
GET INKEY		General: The GET_INKEY requires that the user confirms his/her choice	Yes
	bit 1:	0 = digits (0-9, *, # and +) only	Yes
		1 = alphabet set	Yes
	bit 2:	0 = SMS default alphabet	Yes
		1 = UCS2 alphabet	Yes
	bit 3:	0 = character sets defined by bit 1 and bit 2 are enabled	Yes
		1 = character sets defined by bit 1 and bit 2 are disabled and the Yes/No response is requested	Yes
GET INPUT		General: No. of hidden input characters	252
	bit 1:	0 = digits (0-9, *, # and +) only	Yes
		1 = alphabet set	Yes
	bit 2:	0 = SMS default alphabet	Yes
		1 = UCS2 alphabet	Yes
	bit 3:	0 = ME may echo user input on the display	Yes
		1 = user input not to be revealed in any way (see note)	Yes
	bit 4:	0 = user input to be in unpacked format	Yes
		1 = user input to be in SMS packed format	Yes
	bit 8:	0 = no help information available	Yes
		1 = help information available	Yes
LAUNCH BROWSER			Yes
MORE TIME			Yes
PLAY TONE			Yes

Service		Mode	Support
POLLING OFF			Yes
POLL INTERVAL			Yes
PROVIDE LOCAL INFORMATION		'00' = Location Information (MCC, MNC, LAC and Cell Identity)	Yes
		'01' = IMEI of the ME	Yes
		'02' = Network Measurement results	Yes
		'03' = Date, time and time zone (DTTinPLI)	Yes
		'04' - Language setting	Yes
		'05' - Timing setting	Yes
REFRESH		General: The reset option requests the user to wait while the phone restarts	Yes
		'00' =SIM Initialization and Full File Change Notification	Yes
		'01' = File Change Notification	Yes
		'02' = SIM Initialization and File Change Notification	Yes
		'03' = SIM Initialization	Yes
		'04' = SIM Reset	Yes
SELECT ITEM			Yes
SEND DTMF			Yes
SEND SHORT MESSAGE	bit 1:	0 = packing not required 1 = SMS packing by the ME required	Yes Yes
SEND SS			Yes
SEND USSD			Yes

Service	Mode	Support
SET UP CALL	General: Capability configuration Set-up speech call CallParty Subaddress DTMF support	Yes No Yes
	'00' = set up call, but only if not currently busy on another call	Yes
	'01' = set up call, but only if not currently busy on another call, with re-dial	Yes
	'02' = set up call, putting all other calls (if any) on hold	Yes
	'03' = set up call, putting all other calls (if any) on hold, with re-dial	Yes
	'04' = set up call, disconnecting all other calls (if any)	Yes
	'05' = set up call, disconnecting all other calls (if any), with re-dial	Yes
SET UP EVENT LIST	'00' = MT call	Yes
	'01' = Call connected	Yes
	'02' = Call disconnected	Yes
	'03' = Location status	Yes
	'04' = User activity	Yes
	'05' = Idle screen available	Yes
	'06' = Card reader status	Not Applicable
	'07' = Language selection	Yes
	'08' = Browser termination	Yes
	'09' = Data available	No
	'OA' = Channel status	No
SET UP IDLE MODE TEXT		Yes, 1 row of text is supported
SET UP MENU		Yes
TIMER MANAGEMENT		Yes
OPEN CHANNEL		No
CLOSE CHANNEL		No

Service	Mode	Support
RECEIVE DATA		No
SEND DATA		No
GET CHANNEL STATUS		No

User interaction with SIM AT

Display text

Text of up to 240 characters (120 UCS coded) is supported.

Text clearing times are 5-20 seconds and a 60 second timeout limit for the user to clear the text. ‘Key’ responses:

- ‘Long Back’ – Proactive session terminated by user.
- ‘Back’ – Backward move in proactive session.

Any other key clears the display if the command is performed successfully.

Get inkey

Prompt for a one-character input. Pressing ‘Ok’ without entering a character gives warning message “Minimum 1 character”. ‘Key’ responses:

- ‘C’ clears current character.
- ‘Long Back’ terminates the proactive session.
- ‘Back’ – Backward move in proactive session.
- ‘OK’ – Command performed successfully.

Get input

Prompt for character input. The phone will refuse to accept further input when maximum response length is exceeded. UI Maximum Response lengths:

- Digits Only – 160 characters.
- SMS default alphabet characters – 160 characters, or 1530 characters if concatenation is activated.
- Hidden Characters (digits only) – 20 characters.

‘Key’ responses:

- ‘C’ clears current character.
- ‘Long Back’ terminates the proactive session.
- ‘Back’ – Backward move in proactive session.
- ‘OK’ – Command performed successfully.

Select item

Scroll to highlight item for selection. ‘Key’ responses:

- Navigational key press down – Scroll down list.
- Navigational key press up – Scroll up list.
- Long ‘Back’ terminates proactive session.
- ‘Back’ – Backward move in proactive session.
- ‘OK’– Command performed successfully.

Send short message

Default message “Sending message, please wait” can be replaced for the Alpha Identifier text, or suppressed completely if a null text is provided. Default responses are “MESSAGE FAILED” or “MESSAGE SENT”. ‘Key’ responses:

- Long ‘Back’ or ‘Back’ ends the proactive session.

Set up call

If the ME is on a call when the command ‘Set up Call’, ‘putting all other calls on hold' is sent, the user will see the text 'Setting up a call current call will be held'. If ‘OK’ is pressed the current call will be put on hold and the new call set up.

Integrated browser technical data

Security	WTLS Class 1, 2, 3; WTLS Cipher RC5 with key length 128TLS/SSL; TLS Cipher RC4 with key length 128SignText
Certificates	Predefined: Baltimore, Entrust, GlobalSign, GTA Cybertrust, RSA, Thawte and VeriSign.

Security

Data protection	SIM PIN (at power on)Device Lock (at power on and/or activated by screensaver)
Browser	TLS, SSL, WTLS, Certificate handling
Third party applications	Support for signed applications
Intranet Access	SecureID® from RSA SecuritySafeWord from Secure Computing

Terminology and abbreviations

3GPP™
3rd Generation Partnership Project.

AAC
Advanced Audio Codec.

ALS
Alternate Line Service. A system that allows a user to have more than one line allocated to a single SIM subscription.

AMR
Adaptive Multi-Rate. A variable rate speech coding (compression) method selected by the 3GPP for the 3G evolution of the GSM phones.

API
Application Programming Interface

AU, .au
Format for audio data files.

AWT
Abstract Windowing Toolkit. A Java™ Graphical User Interface library.

BAE
Beatnik Audio Engine™

Bearer
Path over which data flows. Specifically in CSD and HSCSD, the type of telephony link from the GSM network to the server - PSTN or ISDN.

Bluetooth™
Bluetooth™ wireless technology is a secure, fast, point-to-multipoint radio connection technology. It is a specification for a small-form factor, low-cost radio solution providing links between mobile computers, mobile phones and other portable handheld devices, and connectivity to the Internet. Available from the Bluetooth Special Interest Group (SIG), www.bluetooth.com.

Bookmark
A URL and header/title stored in the phone, enabling the user to go directly to a Web page.

BMP
Microsoft® Windows Bitmap. A graphics format defined by Microsoft supporting 1, 4, 8 or 18-bit colour depth. No compression, so files can be large.

bps
Bits per second - rate of data flow.

CB
Cell Broadcast. Type of SMS message.

cHTML
A version of HTML optimized for small devices.

CLDC
Connected Limited Device Configuration. The J2ME 'configuration' implemented in M600. CLDC specifies a runtime environment with specifically limited resources, suitable for memory-constrained devices.

CLI
Calling Line Identity. Shows the number of the person calling you in your mobile phone display. M600 will also display the name and photograph of the caller if they are in Contacts.

You can then make an informed choice as to whether or not to take the call. Bear in mind that not all numbers can be displayed. To use this service, it must be supported by your network.

COM Port
Defines a serial/RS-232 port within the Windows environment. May be physical (COM1 port on the rear of the PC) or virtual (COM5 port communicating with a PC card modem).

CPHS Compliancy

The Common PCN Handset Specification (CPHS) is an industry standard that defines terminal and SIM functionality in addition to the standard GSM specifications.

CS

Circuit Switched. Connection from A to B which has a fixed bandwidth and is maintained over a period of time, such as, a voice telephone call.

CS-1 to CS-4

Coding Scheme. Determines the data rate per timeslot in GPRS.

CSD

Circuit Switched Data. CSD is a GSM service providing a CS data connection at a rate of 9.6 or 14.4 Kbps.

CSP

Customer Service Profile. on a SIM card will determine which menus on the phone are available to the user.

CSS

Cascading Style Sheet. A feature of browsers.

DCIM

Digital Camera Images. The name of the root directory when storing images according to the Design rule for Camera File system (DCF) standard.

DRM

Digital Rights Management; controlling copying and distribution of contents, with respect to intellectual property rights.

DTMF

Dual Tone Multi Frequency. A method of coding digits as a combination of two audible tones.

DUN

Dial-Up Networking.

ECML

Electronic Commerce Modelling Language.

EFR

Enhanced Full Rate, speech coding. Provides better speech quality than HR or FR.

e-GSM

Extended GSM. New frequencies specified by the European Radio Communications Committee (ERC) for GSM use when additional spectrum is needed (Network-dependent). It allows operators to transmit and receive just outside GSM's core 900MHz frequency band. This extension gives increased network capability.

EMS

Enhanced Messaging Service. An extension of SMS enabling pictures, animations, sound and text formatting to be added to text messages. 3GPP has included EMS in the standards for SMS.

ETSI

European Telecommunications Standards Institute. www.etsi.org

FCC

Federal Communications Commission. US government agency which regulates radio communications.

FR

Full Rate, speech coding.

GGSN

Gateway GPRS Support Node

GIF

Graphics Interchange Format. Format for storing images which also supports animated images. Highly compressed by limiting the colour palette to 16 or 256 colours.

G-MIDI

General MIDI. Specifies a minimum level of performance compatibility.

GPRS

General Packet Radio Services.

GSM
Global System for Mobile Communications. GSM is the world's most widely-used digital mobile phone system, now operating in over 160 countries around the world.

GSM 900
The GSM system family includes GSM 900, GSM 1810 and GSM 1900. There are different phases of roll-out for the GSM system and GSM phones are either phase 1 or phase 2 compliant.

GSM 1810
Also known as DCS 1810 or PCN, this is a GSM digital network working on a frequency of 1810 MHz. It is used in Europe and Asia-Pacific.

GSM 1900
Also known as PCS. Refers to a GSM system running in the 1900MHz band. Used in the USA and Canada, for instance.

HR
Half Rate, speech coding.

HSCSD
High Speed Circuit Switched Data.

HTML
HyperText Markup Language.

HTTP
HyperText Transfer Protocol.

IMAP4
Internet Message Access Protocol version 4. Used to collect email from a mail server. Has more features than POP3.

iMelody
A format for monophonic ringtones.

IrDA
Infrared Data Association.

ISDN
Integrated Services Digital Network. Can provide circuit-switched data connections in multiples of 64 Kbps.

ISP
Internet Service Provider.

J2ME™
Java2™ Micro Edition - an edition of the Sun Microsystems Java programming/runtime environment specifying two runtime environment 'configurations' aimed at small devices.

Java™ Phone
An API in Java™ used for interacting with a phone.

JFIF
JPEG File Interchange Format

JNI™
Java™ Native Interface

JPEG
Joint Photographic Experts Group, best known for the .JPG format for still image compression.

JVM™
Java™ Virtual Machine

Kbps
Kilobits per second - rate of data flow.

KVM
'Kilo' Virtual Machine

LAN
Local Area Network.

MAC Address
Media Access Control address. This is a hardware address that uniquely identifies each node on a network.

MBM
Multi Bitmap. Image file format on Symbian OS.

ME
Mobile Equipment. (Phone excluding SIM card)

MeT
Mobile Electronic Transactions. An initiative founded by Ericsson, Nokia and Motorola to establish a secure and consistent framework for mobile transactions.

MIDI
Musical Instrument Digital Interface. MIDI defines a protocol and file format which enables music to be described and stored in binary form.

MIDP
Mobile Information Device Profile. An API (or 'profile' in J2ME nomenclature) defined to enable a standard programming API for mobile devices. MIDP compliant applications execute in the restricted environment defined by the CLDC.

MIME
Multipurpose Internet Mail Extensions. A protocol defining how messages are sent on the Internet. MIME is used to describe how attachments are encoded and what type of data they contain.

MMS
Multimedia Messaging Service. Logical extension of SMS and EMS, MMS defines a service enabling sound, images and video to be combined into multimedia messages.

MMS-C
MMS Service Centre

MO
Mobile Origination. Such as, an SMS message sent from a mobile terminal.

MP3
MPEG Audio Layer 3. An audio compression technology that is part of MPEG-1 and MPEG-2 specifications. Commonly used to distribute music on the Internet and on portable players.

MPEG
Moving Picture Experts Group. A working group of ISO/IEC in charge of the development of standards for coded representation of digital audio and video.

MS
Mobile Station. (Phone and SIM card)

MT
Mobile Termination.

OS
Operating System, such as Symbian OS, Linux, Microsoft® Windows®.

OTA
Over-the Air Configuration. To provide settings for the phone by way of sending a message, SMS, over the network to the phone. This reduces the need for the user to configure the phone manually.

PC
Personal Computer.

PCS
Personal Communications Services, often used to describe GSM1900 networks.

PDA
Personal Digital Assistant. A handheld computer having functions such as address book, calendar etc.

PDF
Portable Document Format. A format created by Adobe for storing and distributing documents.

PDP
Packet Data Protocol.

Personal Java™
An edition of Java™ appropriate for mobile devices such as PDAs.

Phone book
A memory in the SIM card where phone numbers can be stored and accessed by name or position.

PIM
Personal Information Management. Generic term for applications such as Contacts, Calendar, Tasks etc.

PKI
Public Key Infrastructure.

PNG
Portable Network Graphics. Format for storing images on file with data compression but without lowering of quality (loss of information).

Polyphonic
'Many sounds'. The maximum number of notes an instrument can play at the same time, commonly 16 in MIDI devices.

POP3
Post Office Protocol. Used to collect email from a mail server.

PSTN
Public Switched Telephone Network, such as, ordinary analogue phone line for speech and/or computer modem.

PTD
Personal Trusted Device. Concept in MeT

QCIF
Quarter Common Intermediate Format. A video format size of 176 x 144 lines.

QQVGA
Quarter Quarter VGA, 160 x 120 pixels.

QVGA
Quarter VGA size, typically refers to a portrait oriented screen 240 pixels wide x 320 pixels high.

RADIUS
Remote Access Dial-In Service. Facility at the ISP or corporation to manage remote data connections.

RAS
Remote Access Service.

RMF
Rich Music Format™ A file format developed by Beatnik combining the compact size of MIDI files with the high quality of MP3 and WAV.

Rx
Receive

SC
Service Centre (for SMS).

SDK
Software Development Kit

Service Provider
A company that provides services and subscriptions to mobile phone users.

SIM card
Subscriber Identity Module card - a card that must be inserted in any GSM-based mobile terminal. It contains subscriber details, security information and memory for a personal directory of numbers. The card can be a small plug-in type or credit card-sized, but both types have the same functions. M600 uses the small plug-in card.

SIM-AT
SIM Application Toolkit - a means of providing simple applications that are stored on the SIM card.

SMIL
Synchronized Multimedia Integration Language. Used by MMS to describe how media objects are to be played.

SMS
Short Message Service. Allows messages of up to 160 characters to be sent and received via the network operator's message centre to a mobile phone.

SMSCB
SMS Cell Broadcast.

SMTP
Simple Mail Transfer Protocol. Protocol used to send email from an email client via an SMTP server.

SIR IrDA
Standard IrDA, up to 115 kbps IrDA.

SS
Supplementary Service

SWIM
A SWIM card is a SIM card containing a WIM

T9
(Text on 9 Keys) A text input system from Tegic that adds intelligence to multi-tapping letters on a telephone keypad.

TCP/IP
Transmission Control Protocol/Internet Protocol.

TE
Terminal Equipment. Generic term for GSM terminals such as phones and PC cards.

Terminal Adaptor
Generic term for the equipment terminating a digital communications line such as an ISDN2 line. M600 is a Terminal Adaptor since it interfaces to GSM digital data services.

TLS
Transport Layer Security. As used by Web browsers.

Tx
Transmit

TTY (Teletypewriter)
A telecommunication device with a keyboard and a visual display that is used primarily by people who are deaf, hard of hearing, or have a speech disability.

UI
User Interface. Sometimes called 'Man-Machine Interface'.

UIQ
A customizable pen-based user interface for media-rich mobile phones that is based on the Symbian OS. It may be used as the basis for building an attractive and efficient UI.

URL
Uniform Resource Locator. Points to a service or information on the Internet.

USSD
Unstructured Supplementary Services Data. Narrow-band GSM data service. An example is, entering *79*1234# might return the stock price for stock 1234.

V.110
ETSI standard for data over an ISDN circuit.

V.120
ETSI standard for data over an ISDN circuit.

vCal; vCalendar
vCalendar defines a transport and platform-independent format for exchanging calendar and scheduling information for use in PIMs/PDAs and group schedulers. vCalendar is specified by IETF.

vCard
vCard automates the exchange of personal information typically found on a traditional business card, for use in applications such as Internet mail, voicemail, Web browsers, telephony applications, call centres, PIMs /PDAs, pagers, fax, office equipment, and smart cards. vCard is specified by IETF.

VGA
Video Graphics Array. Graphics standard introduced by IBM, having a resolution of 640 x 480 pixels.

VPN
Virtual Private Network.

WAP
Wireless Application Protocol. Handheld devices, low bandwidth, binary coded, a deck/card metaphor to specify a service. A card is typically a unit of interaction with the user, that is, either presenta-

tion of information or request for information from the user. A collection of cards is called a deck, which usually constitutes a service.

WAV

Waveform audio. Format for storing sound.

WBMP

Wireless BitMap. Part of the WAP specifications, an image format optimized for small mobile devices.

WBXML

Wireless Binary Extensible Markup Language.

WIM

Wireless Identity Module.

WML

Wireless Markup Language. A mark-up language used for authoring services, fulfilling the same purpose as HyperText Markup Language (HTML) does on the World Wide Web (WWW). In contrast to HTML, WML is designed to fit small handheld devices.

WTLS

Wireless Transport Layer Security. Part of WAP, WTLS provides privacy, data integrity and authentication on transport layer level between two applications.

XHTML

Extensible Hypertext Markup Language

XML

Extensible Markup Language

Related information

Documents

- The M600 User Guide.
- Sony Ericsson M600 FAQ.
- AT Command Reference Manual.
- WAP 2.0 Specifications.

Links

- www.SonyEricsson.com
- www.SonyEricsson.com/fun/
- www.SonyEricsson.com/developer/
- www.SonyEricsson.com/support
- www.ericsson.com/mobilityworld/
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